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Stainless Steel Members in R-101

British Airship of Record Size Makes Extensive Use of Stainless Steel in Main Frame—Sister Ship Uses Conventional Duralumin Girders

BY JOHN F. HARDECKER*

R-101 the rigid airship built by the British Air Ministry at Royal Airship Works, Cardington, England, and her sister ship, R-100, built by the Airship Guarantee Co. at Howden, England, are now the world's largest airships, both being of 5,000,000 cu. ft. capacity. The R-100 is built of duralumin, which has been prevailing rigid airship practice, while R-101 ushers in an entirely new era in structural materials with its considerable use of stainless steel.

It has been the contention of leading airship designers that the commercial future of the airship lay in far larger sized ships than those of the Zeppelin type. An article in THE IRON AGE, Jan. 3, shows how this development in size has steadily progressed since the first dirigible was built. The lift of an airship increases as the cube of its linear dimensions, while the weight increases only as the square of those dimensions, so that it is only in larger sized ships that radically new methods can be adopted.

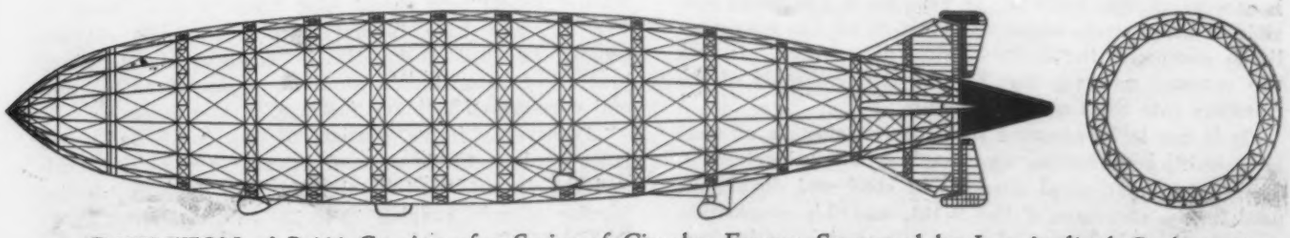
It is impossible to use steel for the skeleton of a small airship, but in one like the R-100 or R-101 of 155 tons displacement (or "lift") the steel framework works out to be lighter than duralumin for a given strength. Since the R-100, built to the same basic specifications but of entirely different design, utilizes duralumin for all its structural members, interesting comparisons will be available during the operating life of these two airships. The present purpose is to describe in some detail the steel framework of the R-101.

Some general figures will convey an idea of the magnitude of this remarkable structure. The length of the R-101 is 724 ft. 3 in., the maximum diameter 131 ft. 8 in. and the height including the control car about 140 ft. The ratio length to diameter is 5.5 to 1. This ratio was determined to give the greatest aerodynamical efficiency from exhaustive tests on models at the National Physical Laboratory. Each of the four fins, including its flap, has an area of approximately 2200 sq. ft. The longitudinal girders total two miles in length and comprise 6 miles of booms, 18,000 side and base struts (which absorb 8 miles of tubing) and 26,952 tie rods totaling 15 miles in length. The tubing of all types in the girders, struts, fins and other parts of the airship totals no less than 27 miles, while 11 miles of cable are used for bracing.

One of the most interesting features to American industry found in the R-101 lies in the possibilities for quantity production in the fundamentally new type of construction which has been used. Whereas the Zeppelin airships have been largely built in place (that is, the members brought together in their final relationship and then riveted) R-101 has been built in sections and erected simply by bolting together. In this it is related to a common bridge or steel building.

All members of the frame were manufactured by Boulton & Paul at Norwich; erection was done in the large

*Chief draftsman, United States Naval Aircraft Factory, Philadelphia.



SKELETON of R-101 Consists of a Series of Circular Frames Separated by Longitudinal Girders 45 Ft. Long, the Various Panels Being Cross Braced by Steel Cable. Frames require no radial ties to center of ship for stability

are also proposed at plant at Lefors, Tex., to cost about like sum.

Texas-Louisiana Power Co., Fort Worth, Tex., has arranged for a bond issue of $1,600,000, part of proceeds to be used for extensions and improvements. Company has acquired properties of Texas-New Mexico Power Co., and will carry out expansion program in that territory, including transmission line construction.

Plant and property of Perry Stave Co., Perry, Fla., have been acquired by new interests, headed by T. F. Williams, Trenton, Fla. New owners plan expansion, with machinery to manufacture wirebound oak barrels, to cost more than $40,000.

Mexican Aviation Co., Brownsville, Tex., W. L. Morrison, vice-president, a subsidiary of Pan-American Airways, Inc., 122 East Forty-second Street, New York, is planning construction of hangars, repair and reconditioning shops, oil storage and other field units at new airport to be located between San Benito and Harlingen, Tex., by both municipalities. Structures will cost about $60,000 with equipment; establishment of field, with buildings to be erected by cities will cost close to $100,000.

J. M. Spain, Millsaps Building, Jackson, Miss., architect has asked bids on general contract for two-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Central Power & Light Co., San Antonio, Tex., operating electric light and power properties, gas and ice-manufacturing plants, is disposing of a bond issue of $6,800,000, part of fund to be used for extensions and improvements.

Southwestern Claude Neon Co., care of Elias Sternglanz, 1831 Texas Street, El Paso, Tex., president, recently organized with a capital of $100,000, is said to be planning operation of local plant to manufacture electric signs and displays.

Rio Grande Oil Co., El Paso, Tex., W. C. Pope, 525 East Seventh Street, general manager, has approved final plans for addition to local refinery for lubricating oil production, to cost $850,000 with machinery. Headquarters of company are at 417 South Hill Street, Los Angeles.

Rubber Products Corporation of Alabama, Inc., Muscle Shoals, Ala., has plans for expansion, including installation of additional equipment for production of rubber flooring and other hard rubber products. Company has arranged for increase in capital to $200,000, part of fund to be used for development. It has purchased Maumee Valley Rubber Co., Toledo, Ohio, and will operate as an affiliated organization. Carroll Dunn, president of the *Toledo Blade*, heads company.

Indiana

INDIANAPOLIS, June 17.—Contract has been let by Empire Oil & Refining Co., Empire Building, Bartlesville, Okla., to H. B. Olney, 1200 East Chicago Avenue, East Chicago, Ind., for new oil refinery at East Chicago, to cost more than $2,500,000 with equipment. C. Briggs is company engineer, in charge.

Thornton & Rodecker, 658 Fairfield Avenue, Indianapolis, architects, have awarded general contract to Service Construction Co., Castle Hall Building, for automobile service, repair and garage building, to cost about $100,000 with equipment.

Indiana State Normal School, Calvert Avenue, Muncie, L. A. Pittenger, president, has awarded general contract to A. J. Glaser, 610 South Jefferson Street, for two-story vocational training school addition, to cost about $60,000 with equipment. Snyder & Babbitt, Hayden Building, Columbus, Ind., are architects.

Supreme Oil & Refining Co., Lumber Insurance Building, Indianapolis, specializing in production of fuel oil, has plans for new refinery on 35-acre tract, with initial unit to cost about $100,000 with equipment. Irving W Lemaux is president

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has awarded general contract to Shaner Brothers, 1025 Lewis Street, for rebuilding part of four-story plant, 100 x 160 ft., to cost over $60,000 with equipment.

N. O. Nelson Mfg. Co., Noblesville, manufacturer of plumbing equipment and supplies, is planning to rebuild part of plant recently destroyed by fire. Headquarters are at Tenth and Chestnut Streets, St. Louis.

Pacific Coast

SAN FRANCISCO, June 13.—Bids will be asked early in July by Port Stockton Cement Co., 1101 Claus Spreckles Building, San Francisco, for initial units for cement mill near Sonora, Cal., to cost about $2,000,000 with machinery. Company was organized recently by W. C. Stevenson, formerly connected with Pacific Portland Cement Co., and others. A. E. Roberts, address noted, is company engineer.

Hollywood Casket Co., 1024 North Orange Drive, Hollywood, Cal., has plans for two-story plant, 88 x 200 ft., to cost about $55,000 with equipment. Pope & Burton, Beaux Arts Building, Los Angeles, are architects.

Barshow & Baleria, 501 South Market Street, San Jose, Cal., manufacturers of automobile bodies, have plans for new one-story plant, to cost about $25,000 with equipment.

Escondido Union High School District, Escondido, Cal, has authorized plans for new high school group, including one-story manual arts and shop building, entire project to cost $125,000. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Goodyear Tire & Rubber Co., Akron, Ohio, has awarded general contract to S. E. Mulcock, 1240 Harvard Avenue, Salt Lake City, Utah, for one-story factory branch and distributing plant, 100 x 140 ft., at Salt Lake City, to cost about $80,000 with equipment. Slack Winburn, Beason Building, Salt Lake City, is architect.

Boeing Airplane Co., Hoge Building, Seattle, has awarded general contract to Austin Co., for hangar, 100 x 200 ft., with shop and repair facilities, to cost $70,000 with equipment.

Zellerbach Paper Co., Sacramento, Cal., is planning to rebuild part of factory branch and distributing plant at Spokane, Wash., destroyed by fire, June 4.

Washington Irrigation & Development Co., Seattle, has applied for permission to use water from Columbia River near Priest Rapids, Grant and Yakima Counties, for hydroelectric power development. Project will provide for generating plant of 450,000-hp. capacity, divided into two units, first of 200,000-hp. output to be ready for service in about 24 months. Work will include a steel tower transmission line, and will cost more than $35,000,000.

Breese Aircraft Corporation, Portland, has been organized to take over and operate company of same name with local airplane manufacturing plant. New company has arranged for early sale of 40,000 shares of stock, no par value, part of fund to be used for general expansion.

Canada

TORONTO, June 17.—Machine tool sales fell off during the week, but inquiries are in good volume. Current demand is confined to single tools. Industrial building is being carried out on a large scale and there are a number of companies with construction work sufficiently advanced to warrant equipment purchases soon. The railroads are also expected to come into the market within the next two or three months. Small tools are moving freely.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, contemplates an addition to its plant at Bowmanville, Ont. C. H. Carlisle, 152 Simcoe Street, Toronto, is manager.

Bids are being received, no closing date set, for three-story factory addition at Stratford, Ont., for Kroehler Mfg. Co., to cost $40,000.

Office Specialty Mfg. Co., Newmarket, Ont., has awarded general contract to Herod Construction Co., Mimico, Ont., for a three-story addition.

Several contracts have been awarded for a $200,000 factory to be erected at Toronto, for the F. J. Hartz Co., Ltd.

Fegles Construction Co., Port Arthur, Ont., has been awarded general contract for an addition to Sarnia Grain Elevator, Sarnia, Ont., to cost $593,050.

Western Canada

Contracts totalling $2,072,000 have been awarded in connection with the $7,250,000 hydroelectric power development on the Stave River at Ruskin, for the British Columbia Electric Railway Co., Vancouver, B. C. The contract for the power plant has not been let.

Cater-Halls-Aldinger Co., Ltd., has been awarded contract for 2,750,000-bu. addition to elevator at Vancouver, B. C., for Alberta Wheat Pool. C. D. Howe & Co., Ltd., Port Arthur, Ont., is consulting engineer.

Foreign

PLANS are being considered by Cros Sociedad Anonima, Barcelona, Spain, for new plant near Corunna for production of sulphuric acids, superphosphates and kindred specialties, to cost more than $600,000 with machinery. It is proposed to secure phosphate rock from Morocco, and iron pyrites from Huelva district.

Samuel R. Rosoff, head of Rosoff Subway Construction Co., 461 Eighth Avenue, New York, has contracted with Soviet Russian Government, Moscow, to construct a waterworks in that municipality to cost $40,000,000, project to be completed within 36 months. It will include power equipment, pumping machinery, pipe lines, etc. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agent for Soviet Union.

Leslie Barlow-Massicks, sales manager, Steel, Peech & Tozer, Ltd., Rotherham, England, manufacturer of Iron and steel products, is at head of project to establish new plant to manufacture steel springs. A company will be formed. A part of former steel plant of John Spencer & Son Ltd., Newburn, Newcastle-on-Tyne, has been purchased from T. W. Ward & Co., Ltd., Sheffield, which recently acquired the property.

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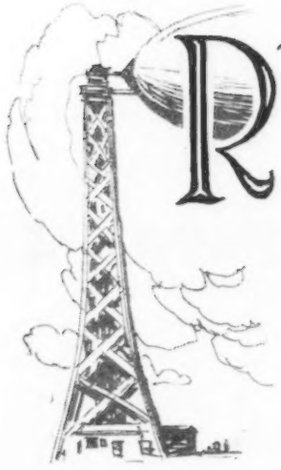

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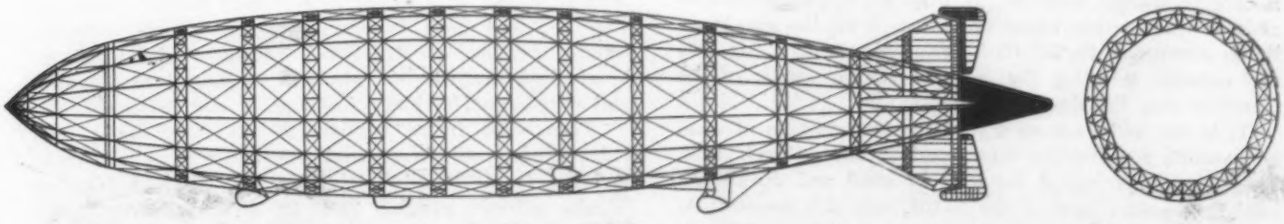

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hangar at Cardington by means of close fitting bolts. Extreme accuracy in the lengths of all members and the angles of all joints was therefore requisite. Calculations had in many cases to be carried to fifteen significant figures. Accuracy of design obviously had to be accompanied by an equivalent accuracy in the manufacture of individual components, which naturally called for high standardization and the extensive use of precise jigs. The added expense of manufacture of the individual parts has been more than recovered from the ease with which the R-101 has been erected by a very few workers in a very short space of time without any fitting in the field. There also remains the possibility that additional airships may be built speedily and economically with the existing jigs and fixtures.

As there existed no previous standards by which permissible tolerances on members of this particular class and form could be estimated, very close limits were fixed. Main longitudinal girders, 45 ft. long, were required to be within 0.030 in. absolute length, with a permissible variation between individual members of the same nominal dimensions of 0.020 in. Main radial struts 11 ft. long were required to be within 0.015 in. of absolute length with maximum differences between individually similar members of 0.005 in. Frame longitudinal girders 10 ft. long had a tolerance of 0.020 in., and ridge girders 12 ft. long were allowed 0.025 in. In practice, it was found possible to keep within about one-third of all the maximum limits except on the 45-ft. longitudinal girders. It was this extreme accuracy that assured easy assembly of the members into the finished structure.

It is not to be assumed that the introduction of steel into airship construction was merely a happy inspiration. There are about equal amounts of steel and duralumin used in the structure of the R-101, and this proposition presents the culmination of years of painstaking development. In 1924 Boulton & Paul designed and constructed two longitudinal girders which embodied several new features, particularly their process for continuously heat treating members formed from steel strip. This process was itself the result of long experimentation, and enabled stainless steel to be used in airship construction. A complete transverse frame for the proposed airship was also built and satisfactorily tested.

A large dirigible is of necessity a complex structure, so it is difficult to select any one feature as forming the basis of the design. Of its many unusual features, the use of rigid transverse rings or frames certainly is outstanding. Previous practice has been to use frames which were like wheels—they had to be braced by radial wires running to the center of the ship. Elimination of these wires in the R-101, and further simplification of main joints so the stresses in the various members may be figured from the principles of statics, are most notable items from the designer's viewpoint.

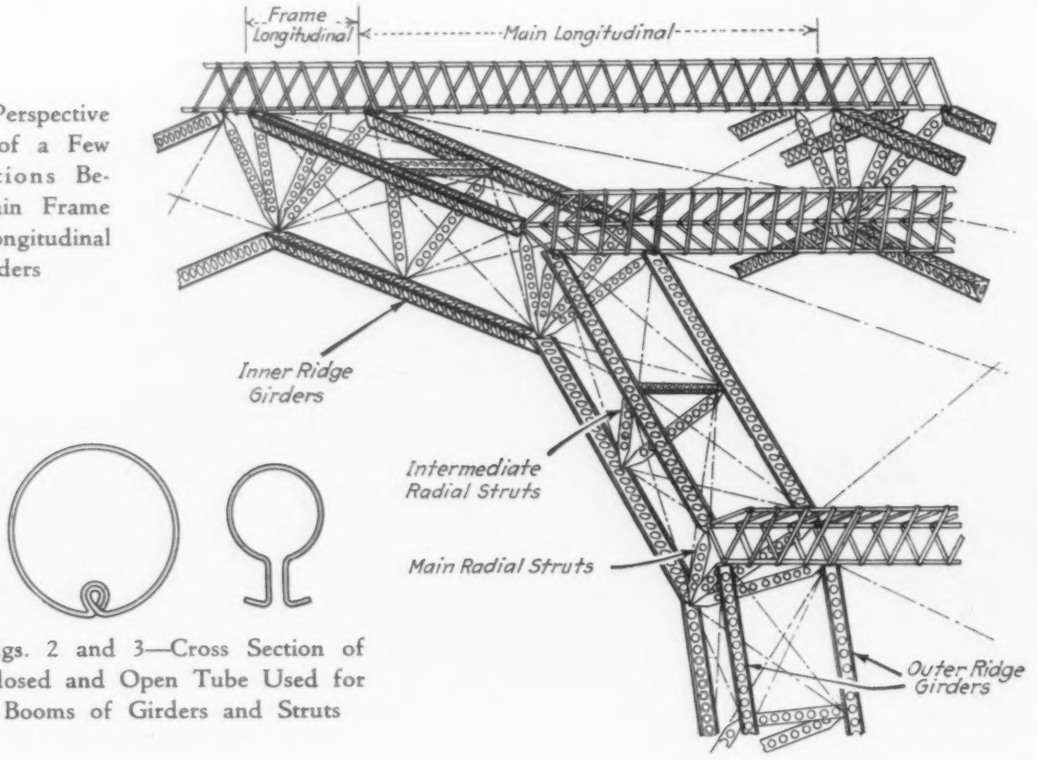


Fig. 1 — Perspective Drawing of a Few Intersections Between Main Frame and Longitudinal Girders

Figs. 2 and 3—Cross Section of Closed and Open Tube Used for Booms of Girders and Struts

So much for the general features of the R-101. That one may identify the individual members in a necessarily condensed description, a perspective drawing of a few panel points is printed as Fig. 1.

Main longitudinals are girders of triangular section, 15 in number around the complete circle, except over the tail where they are increased to sixteen. Each is about 45 ft. long, the clear distance between girders of the transverse rings. They are made of three stainless steel tubular booms with closed joint (cross section shown in Fig. 2), and have tubular duralumin struts between booms. Detailed construction is shown in Fig. 4. Cross bracing of swaged rods, similarly arranged to the normal wire-braced airplane fuselage, is also employed.

Transverse frame consists of the inner and outer ridge girders, the main and intermediate radial struts and the frame longitudinal (Fig. 1). It is a 14-sided regular polygon, ranging up to 130 ft. diameter as shown in Fig. 8. The periphery of this polygon is of triangular crosss-section, about 10 ft. on a side.

Inner and outer ridge girders for the transverse

frames are of triangular section about 12 ft. long. They form the sides of the above mentioned polygon. Their booms are rolled from stainless steel and are of the bulbous type shown in Fig. 3. Webs are of duralumin sheet double thickness 8 in. wide, with punched and flanged holes for lightness.

Radial struts, both main and intermediate, are of triangular section about 11 ft. long. As the loads are smaller, the booms are rolled from duralumin in the bulbous section shown in Fig. 3. Stamped duralumin webs, 8 in. wide, with punched and flanged lightening holes are used in single thickness.

simplification in the design may best be realized by comparing the view of a joint in a Zeppelin, taken after a crash during the war.

Stainless steel strip, used for the closed joint tubes of the main longitudinals and for the booms of the ridge girders, has the following composition and properties:

Carbon	0.16 to 0.22 per cent
Silicon	0.5 per cent (maximum)
Nickel	1.0 per cent (maximum)
Chromium	12.5 to 14 per cent.

After hardening from a temperature of 960 to 1000 deg. C., and tempering at a suitable temperature, this strip

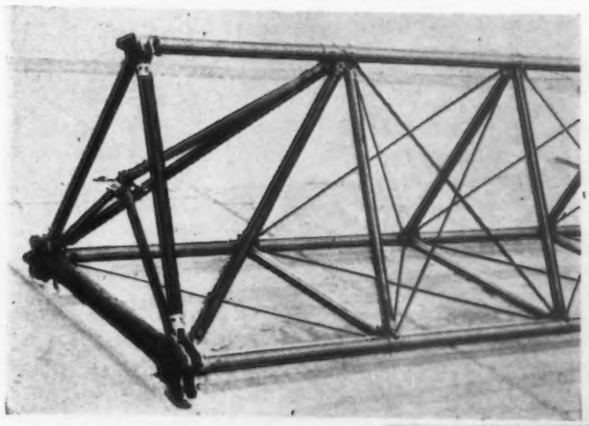


Fig. 5—Ridge Girders Have Stainless Steel Booms (Open Type) With Webs of Doubled Duralumin Sheet, Punched and Flanged

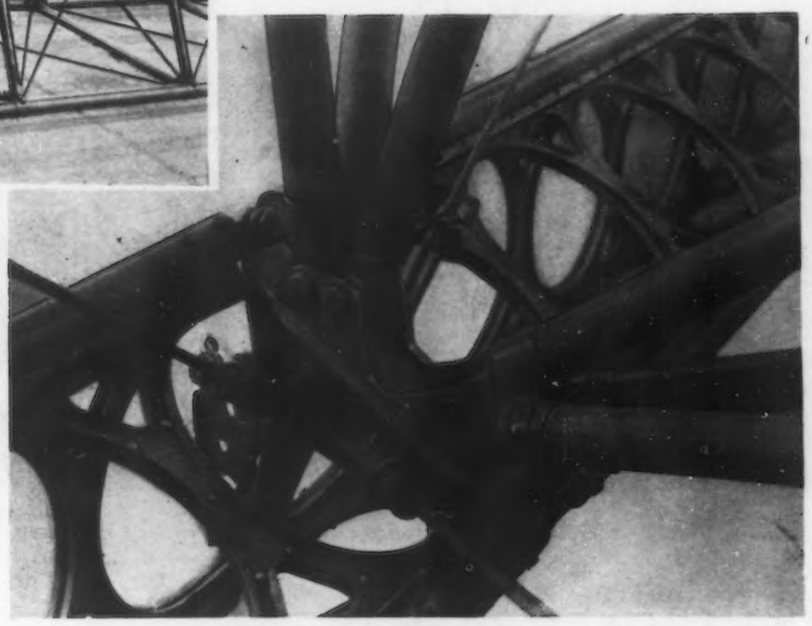


Fig. 4—Main Longitudinal and Frame Longitudinal Consist of Stainless Steel Booms, Tubular Duralumin Struts, and Swaged Rod Cross Bracing

Frame longitudinals are relatively short lengths of fore-and-aft girder placed over the outside of each frame corner. Since the main longitudinals must be built in sections, the transverse frames are the logical dividing points, and this member is really a part of the transverse frame. Frame longitudinals are about 10 ft. long and of similar construction and material to the main longitudinals.

Stranded wire cable is used for cross bracing. No single cable larger than 37 strands was used, duplicate cables being installed for greater loads. Exhaustive tests on the cables with end fittings showed that after once loading to half the nominal breaking load of the cable, successive loadings below that point caused no permanent set. Young's modulus ranged between 22,000,000 and 25,000,000 lb. per sq. in.

Intermediate to these main members are often many smaller ones used to meet special conditions arising at specific points. The detailed fittings at the joints are in themselves an interesting study, but are described best by reference to the photographs (copyrighted views published by permission of the British Air Ministry). The

has the following physical properties:

Proof stress:* 145,000 to 154,000 lb. per sq. in.
Ultimate stress: 198,000 to 210,000 lb. per sq. in.
Cold bend without cracking, about a radius three times the thickness.

Stainless steel sheets and plates for making the fittings and wiring plates are of an austenitic steel. This depends somewhat on cold working for its required physical properties; it is worked in the quenched condition. Typical composition and physical properties follow:

Carbon	0.14 per cent
Silicon	0.36 per cent
Nickel	10 per cent
Chromium	16 per cent

Proof stress:* 112,500 lb. per sq. in.
Ultimate stress: 131,200 lb. per sq. in.
Elongation in 2 in.: 28.5 per cent.

Drawn steel tubes, hardened and tempered, of the com-

*Proof stress is a British term, essentially representing the elastic limit of the material. In the case of stainless steel strip it is defined as "that stress at which the stress-strain diagram departs from the straight line of proportionality by 0.1 per cent of the gage length." For stainless steel sheet, the definition is "that stress at which the stress-strain diagram departs from the straight line of proportionality by 0.5 per cent of the gage length."

position employed for axle tubes, are also used in some places. These are usually of large diameter and thin gage (2¼ by 21 in. and 2¾ by 20 in. predominate) and are difficult to heat treat without distortion. Nevertheless these tubes have been heat treated to give values corresponding approximately to those of the closed-joint tubes of stainless steel strip, namely:

Proof stress: 136,000 lb. per sq. in. (minimum)
Ultimate stress: 180,000 to 202,000 lb. per. sq. in.
Cold bend about a radius five times the thickness without cracking.

Steel stampings are all of high-tensile, heat-treated steel having a minimum tensile strength of 125,000 lb. per sq. in. These are used for shackles for the bracing wires in the main longitudinals and for other similar purposes.

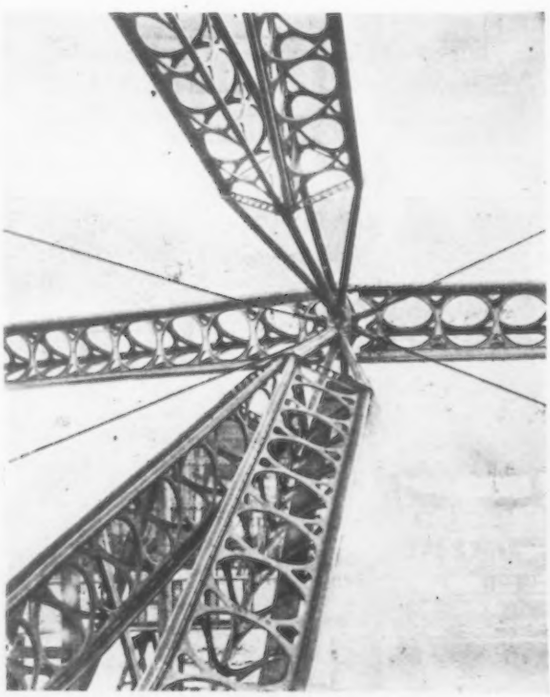
Duralumin in the booms of the radial girders have the same section as the steel in the ridge girders. Closed-joint tubes of duralumin similar to the booms in the main longitudinals are also used. Stamped sheets form the girder webs. Before forming, this material is heated to 480 deg. C., quenched, and then all cold work is completed during the next two hours. Duralumin die stampings are employed for the end joints between ridge girders and longitudinals.

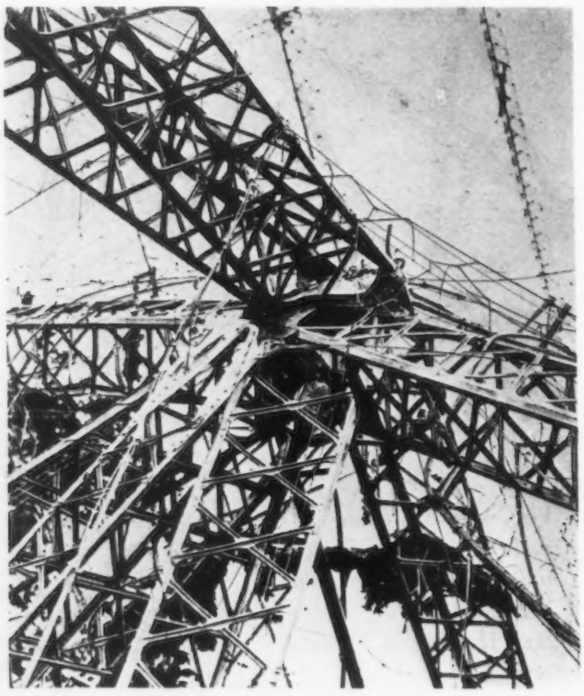
Thousands of aluminum-silicon alloy die castings—(10 to 14 per cent silicon) are used, cast with great dimensional accuracy, sound and with very good ductility. The specified mechanical properties of chill-cast 1-in. test pieces are:

Ultimate tensile strength: 27,000 lb. per sq. in. (minimum)
Elongation in 2 in.: 7 per cent (minimum)

Zinc-cadmium solder is another important material used in the structure of R-101. Bracing cables are provided with an adjustable end fitting which houses the end of the cable in a cone-shaped socket. Solder is used to form a solid cone with the splayed-out ends of the strands of the cable, strong enough to prevent the cable from pulling through. The cadmium-zinc eutectic has a low melting point as well as sufficient shear strength. Its chemical composition is cadmium 82.6 per cent and zinc 17.4 per cent. The melting point is 263 deg. C., and the shear strength as solder 15,700 lb. per sq. in.

Methods used by Boulton & Paul for working the stainless steel have been so successful that one may regard the manufacture of special sections in stainless steel as having been put into mass production. Essentially the process consists of forming the sections from annealed strip, and then carrying out the hardening and tempering by a continuous process which assures uniform physical properties and close tolerances.





Figs. 6 and 7—Simplicity of Joint in Lower Ridge Girder Contrasted with Similar Intersection Photographed from a Wrecked Zeppelin

For instance, the corrugations which later form the closed joint in the tube (Fig. 2) are formed along the edges of the strip by drawing the strip through dies. Then the strip with its curled edges is curved to a circular section by passing through other forming dies. The final seaming is done by pulling the section through a circular die and over a mandrel which is shaped so as to fold the corrugated edges over one another. A reinforcing liner can also be formed inside the main tube for special members carrying greater loads for short distances. This entire operation of forming the closed-joint tube is done in a continuous pass through several dies set in one draw bench.

This formed section is then pulled through an electric furnace for the hardening heat. A die is set up on the entering side of the furnace of such section as to cause a reasonable amount of friction. This assures that the tube shall be kept straight under the pull. In the furnace it is raised to about 1050 deg. C., and emerges through a hollow circular die in which cold water is kept circulating. This constitutes the quench. Tempering is done in a very similar manner, except that the temperature is about 420 to 450 deg. C. Tubes up to 70 ft. long are produced in

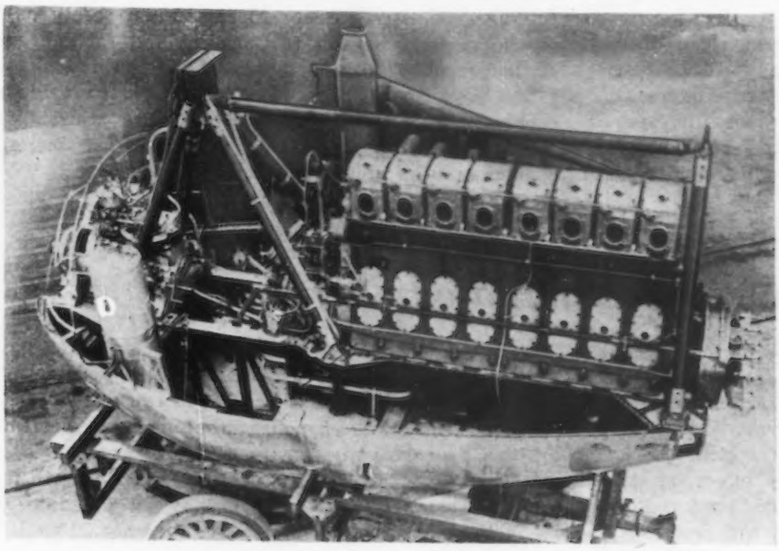


Fig. 9—Beardmore 650-Hp. Engine, to Burn Heavy Oil

this closed-joint section on the draw-benches installed. Cutting to length after hardening and tempering is done by a thin mild steel disk run at high speed.

The greater part of the steel used in the airship is stainless. Other minor steel members are zinc-coated by a modified Sherardizing process. All duralumin parts are given an anodic treatment and then coated with lanoline. The aluminum-silicon alloy die castings possess excellent inherent anti-corrosion properties and require no special treatment. Since cadmium is very closely related to zinc chemically, the solder introduces no risk of corrosion from electrochemical action with the zinc-plated fittings and galvanized wire.

There are five engine cars, each attached at two points only, so they can be readily detached entire, when it is necessary to change an engine. Each car contains one Beardmore 650-hp. water-cooled engine, built to burn heavy oil. Use of heavy oil is dictated as a safety measure, since the heavy fuel oil when poured on a gasoline fire will put it out. The engine also shows a 30 per cent saving in fuel, as compared with a gasoline engine; while it weighs 8 lb. per horsepower, it is believed that future refinements in design will cut this in half. The engine is so arranged in the car that there is ample room to remove a cylinder head, piston or connecting rod while the ship is in flight.

Fuel oil tanks each hold 224 gallons (equivalent to 1870 lb.). Fuel from any of these tanks can be run into special pressure tanks from whence it can be blown by compressed air to any reservoir in the ship. This new feature facilitates feeding the engines and trimming the ship. Certain tanks are fitted with special disks and circular cutters for dumping the contents in an emergency. Tanks are installed on the passenger deck to supply compensating weight when the full passenger complement is not carried, or to provide extra capacity for long demonstration flights without passengers. Without using these special tanks, 29 tons of heavy fuel oil can be carried.

Passenger accommodations are located on two decks inside the ship near the bottom. The upper deck (exclusive of the promenade) has an area of 5500 sq. ft. The lower deck has an area of 1730 sq. ft., which can be increased later, if found necessary, to approximately 4000 sq. ft. by means of side wing decks. On the upper deck is a lounge with promenades on either side, from which the passengers may obtain an outward view. This deck also carries a separate dining room for 50 persons, a number of two-berth sleeping abins and necessary toilet facilities.

The lower deck carries the captain's control room, and beneath this a control car projects outside the envelope. The kitchen with its electrical cooking arrangements is located on the lower deck. The lower deck also carries a smoking room and quarters for the crew. The

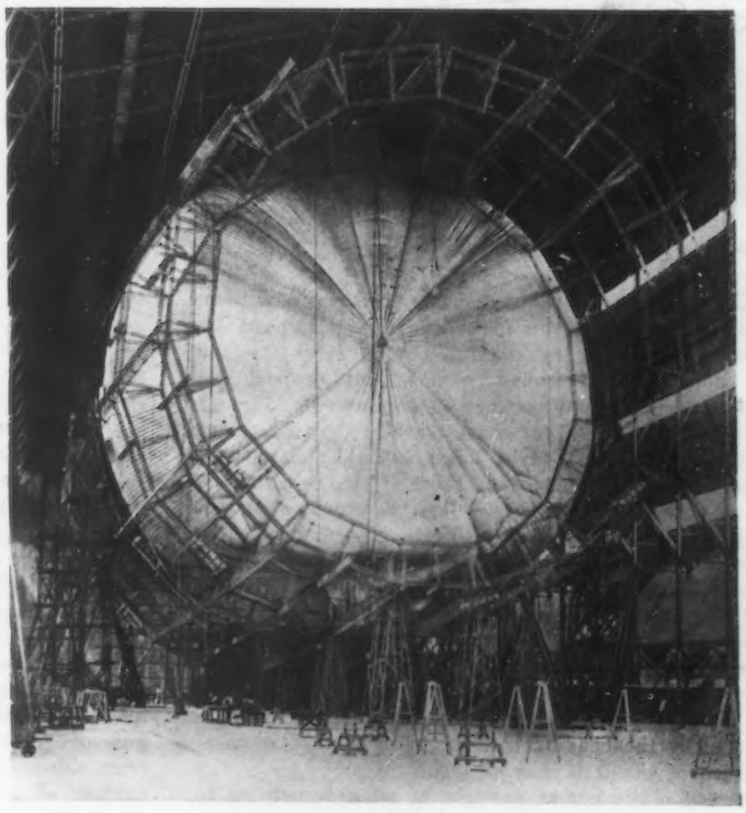


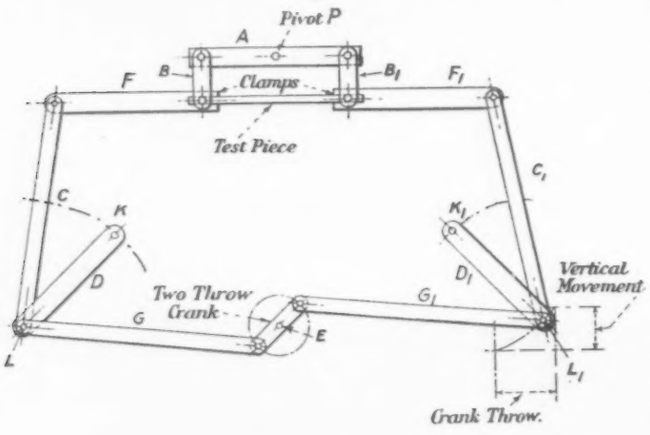
Fig. 8—General Assembly of Five Main Frames with One Gas Cell in Position

crew consists of a captain, three officers and 42 men. The ultimate installation will provide accommodations and berths for 100 passengers.

Many points of interest must be omitted in this brief description of such a tremendous airship as R-101. When looking upon it as the world's largest airship, one must not be swept away by enthusiasm for mere size; it represents much more than just a larger airship. The builders have gone back to the basic principles, utilizing all that has been learned from past airship construction, operation and maintenance, and started anew on a plan which takes full view of the necessity for maximum safety as well as the modern demand for comfort and for fabrication methods that are directly applicable to production. Some of the basic developments in materials, particularly steels, represent more than mere applications to airship construction, for they undoubtedly open fields for steel development in other industries.

Endurance of Laminated Springs

AN extended series of tests is being made by the springs research committee of the British Department of Scientific and Industrial Research, to determine the endurance of spring steel plates under repetition of reversed bending stress, the displacement of vehicle springs under road-running conditions, and the effect of the mechanical properties of laminated springs produced by the "nip" to which they are subjected in the process of assembly. From these tests R. G. Batson and J. Bradley of the National Physical Laboratory conclude that the explanation of the unexpected spring fractures now found in service may lie in an effect due to the skin on the leaves of the spring.



Testing Machine Designed to Alternate Bending Stresses in a Spring (Test Piece) in Studying Endurance of Laminated Springs. Alloy steel seems little better than carbon steel

A special testing machine has been devised, the elements of which are sketched in *Engineering*, Jan. 11, 1929. The test piece (ordinarily a heat treated spring leaf up to ⅜ x 2 in., 18 in. long) is rigidly clamped at the ends of arms F and F_1. Pivot P can be raised so that any desired initial stress can be imposed on the sample. Alternate bending during the test is induced by the angular motion of F and F_1 which is transmitted from the crank shaft E through the arms C and C_1 made of light aluminum alloy. The amount of bending is controlled by locating the fixed points K and K_1 at appropriate points in a circular slot indicated by the dotted arcs. The machine is driven at 500 to 1500 r.p.m. by a 1-hp. variable-speed motor. The amount of stress is measured by the bending in arm A, or by the radius of curvature of the test piece.

The automatic cutout consists of an arm parallel to the test piece and just above it. This arm carries six screws, adjusted so as just not to touch the test piece in its position of maximum strain. When the piece cracks, its contour changes sufficiently to foul one or more of the screws, and so open a switch in the motor circuit. The screws are usually set so close to the test piece that the insertion of a piece of paper will cause a stop.

Endurance limits on polished specimens as determined by this machine agree with those determined by the rotating beam method. However, if the leaves are tested in the same surface condition as when put into commercial springs, the endurance limit is only 22 to 40 per cent as high.

Six-leaf springs, designed for a working load of 392 lb., and made of carbon and alloy steels of various compositions and heat treatments are being studied extensively. Some surprise is felt at the fact that the alloy steel springs, when tested in this way, gave little if any better results than those of carbon steel.

Recovery of Secondary Metals An Important Industry

Collection of waste material as an established branch of industry has been given consideration by United States Bureau of Mines. There are more than 3000 scrap iron and steel yards in the United States, many of which have extensive equipment. No data are collected by the Bureau of Mines showing the quantity of secondary ferrous metals recovered, but it is estimated that, exclusive of the scrap available at steel mills, railroads and large manufacturing plants, more than 5,000,000 tons of miscellaneous ferrous scrap is collected and sold annually. This estimate does not include rails, pipe, machinery and other equipment renovated and sold for original use. This use of old material is very extensive in all parts of the country.

Nearly 500,000 net tons of secondary copper is recovered annually in the United States. This is recovered from copper metal, brass scrap and other copper alloys. Nearly 300,000 tons of secondary lead are recovered annually. The main sources of supply of secondary lead are old pipe, lead cable, battery plates and lead lining of acid tanks, although a large quantity is derived from babbitt, solder, terne metal, type metal, brass and white metal drosses. Large quantities of secondary zinc are recovered by redistillation, sweating, remelting, etc.

Enormous quantities of secondary tin are recovered annually. Nearly all detinning is done in the United States by the electrolytic process or the chlorine process. Production of secondary antimony is mainly from alloys. The recovery of secondary aluminum as pig aluminum or in alloys amounts to nearly 50,000 tons annually. A large quantity of No. 12 secondary ingots (92 per cent aluminum and about 8 per cent copper) is made by smelters from old or defective castings, borings and scrap, but the number of alloys containing aluminum has greatly increased in recent years, and the use of No. 12 alloy is proportionately less than it was.

Secondary nickel recovered as metal or in non-ferrous alloys and salts amounts annually to over 3000 tons.

Hardening Steel with Ammonia

Nitralloy Under the Microsope—How Such Hardened Steel Wears

Corrosion Resistance a Valuable Property—Remove Decarburized Areas

BY DR. V. O. HOMERBERG*

THE necessity of complete removal of strains set up in forging, machining and in hardening in order to prevent warping or distortion during nitriding has been emphasized. Straightening of parts after nitriding may be required if this precaution is not observed. This is especially likely to occur in thin flat sections or in parts having a large diameter at one end and a long section with a smaller diameter at the other end, such as in certain types of spindles, fine pump plungers, etc. It has been found quite possible to straighten such parts even when done cold. Since the hardness of the case is not affected at 1000 deg. Fahr., it is obvious that the straightening operation can be well applied to the hot material.

Decarburized Layers Must Be Removed

Great emphasis should be given to the necessity for the complete removal of the decarburized layer before nitriding. If this precaution is not observed, the nitrided case will lend itself to chipping and flaking. Photomicrograph Fig. 7 shows the appearance of the case resulting from the nitriding of a decarburized specimen. The black areas in the decarburized zone represent voids. Sufficient material must be left for final machining or grinding before nitriding to insure the complete removal of all traces of decarburization resulting from the forging and the heat-treating operations.

A typical procedure to follow in the case of an article machined from an annealed bar is to rough machine, heat treat, finish machine and then nitride. The rough machining should be done with proper observance of the precaution mentioned above. The heat treatment involves quenching in oil from the proper hardening temperature, followed by a draw at least as high as the nitriding temperature to obtain proper physical properties for the core and to relieve machining and hardening strains. Sufficient time should be allowed for this operation in order to prevent warping or distortion on nitriding. The final machining or grinding must remove all traces of decarburization. Nitriding for the proper time to meet the conditions completes the operation except for a possible finishing operation, such as lapping, on the nitrided article. The treatment of forgings should be considered with due precaution to eliminate decarburization before case hardening with ammonia.

Structure of Nitrided Specimens

The photomicrographs, Figs. 8, 9, 10 and 11, show the depth and character of the case obtained by nitriding heat-treated specimens of Nitralloy "H." The specimens were oil-quenched from 1750 deg. Fahr. and tempered at 1000 deg. Fahr. before nitriding at 950 deg. Fahr., for 24, 48, 72 and 96 hr.

In the nitriding of heat-treated specimens, the line of demarcation between the case and the core is frequently impossible to determine by a microscopic examination. A dark band, representing the structure which etches most rapidly with alcoholic nitric acid, is generally present as indicated in the photomicrographs. In Fig. 11 the case occupies the greater part or all of the micrograph. The fineness of the structure of the nitrided zone in each instance is quite evident. Fig. 12 shows the case produced by nitriding nitralloy "G," previously oil-quenched from 1650 deg. Fahr. and tempered at 1000 deg. Fahr., followed by nitriding for 96 hr. at 950 deg. Fahr. The excellent structure of the case is clearly indicated.

Growth Due to Nitriding

A slight growth takes place during nitriding. Table III shows the increase in length and in diameter of cylinders of Nitralloy "G," previously oil-quenched from 1650 deg. Fahr. and tempered at 1000 deg. Fahr. for 4 hr., followed by nitriding at the indicated temperature for 48 hr. Prior to nitriding, these cylinders were accurately ground, after which they measured 5.8160 in. in length and 0.7100 in. in diameter.

This growth can be allowed for in the final machining or grinding before nitriding, or it can be removed afterward by lapping or by other suitable means.

A greater surface hardness can be obtained by this method of case hardening than by any other means. A surface hardness equivalent to 1000 Brinell is common.

*Assistant professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., and consulting metallurgist of the Ludlum Steel Co. This is the concluding section of the article in THE IRON AGE, June 6, at page 1562.

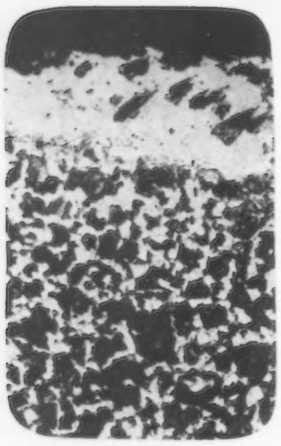


Fig. 7 — Photomicrograph of the Appearance of the Case Resulting from the Nitriding of a Decarburized Specimen. x 100

Since the case gradually merges with the core there is no tendency for the two to separate.

Another valuable property which accompanies the extreme surface hardness of nitrided Nitralloy is the resistance to atmospheric, water and salt water corrosion. The maximum resistance to corrosion is exhibited by the unpolished surface. In view of this fact, it is preferable to place nitrided articles directly into service without additional polishing whenever the question of corrosion is involved. It is obvious that this property of rustlessness together with extreme surface hardness renders nitrided articles highly desirable for a great many purposes.

Nitrided Nitralloy retains great hardness at elevated temperatures. It shows practically the same degree of hardness when tested at 932 deg. Fahr. as at room temperature and shows an excellent degree of hardness when tested at 1400 deg. Fahr.

Protecting Sections from Hardening

It frequently happens that threaded portions or other areas must be protected in order not to become surface hardened. Nickel plating to a depth of at least 0.0005 in. has proved to be satisfactory. A coating of tin or solder is also a good protective agent. Tin melts at a temperature a great deal lower than the nitriding temperature. The cleaned article is dipped into the molten tin and held for a short time so as to become heated somewhat in order that the tin will not freeze immediately on the part when it is removed from the bath. The excess tin can be shaken off or removed with a wire brush. A sufficient coating will adhere to the articles by surface tension, to insure ample protection. Before the article is dipped into the molten tin or solder, it should be cleaned and a flux applied. The flux used has the following composition:

Hydrochloric acid	500 cc.
Water	250 cc.
Ammonium chloride	15 grams

Add scrap zinc until no further action takes place. The articles to be tinned must be free from rust or scale.

It is obvious that a protective agent, which might be applied as a paint, is highly desirable. This problem has received a great deal of attention in the author's laboratory, with positive results. The composition of this material will be divulged as soon as all details have been thoroughly studied. A number of experiments have been performed to demonstrate its adequacy as a protective agent.

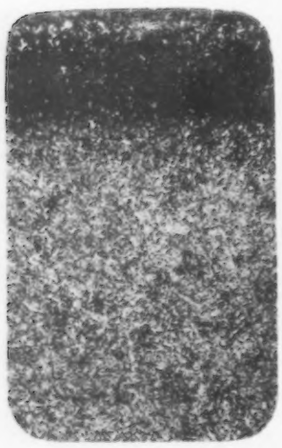


Fig. 8

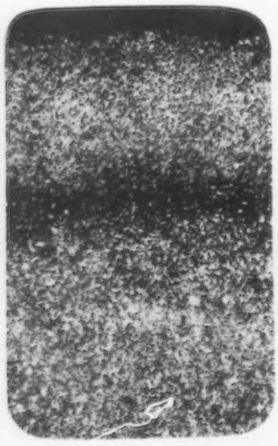


Fig. 9

Fig. 10

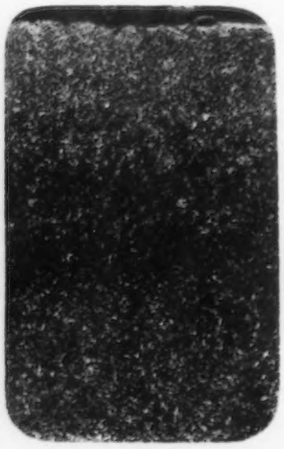


Fig. 11

Fig. 8—Structure of Nitralloy "H," Oil Quenched from 1750 Deg. Fahr., Tempered at 1000 Deg. Fahr., Nitrided at 950 Deg. Fahr. for 24 Hrs. x 100. Fig. 9—Same as Fig. 8 but Nitrided for 48 Hrs. Fig. 10—Same as Fig. 8 but Nitrided for 72 Hrs. Fig. 11—Same as Fig. 8 but Nitrided for 96 Hrs., All at 950 Deg. Fahr.

Table III—Increase in Length and Diameter of Nitralloy Cylinders

Nitriding Temperature in Deg. Fahr.	Increase in Length in Inches	Increase in Diameter in Inches
900	0.001	0.0003
950	0.002	0.0009
1000	0.003	0.0011

Service Tests of Wearing Properties

The use of nitrided Nitralloy in various commercial operations has fully demonstrated its great wearing prop-

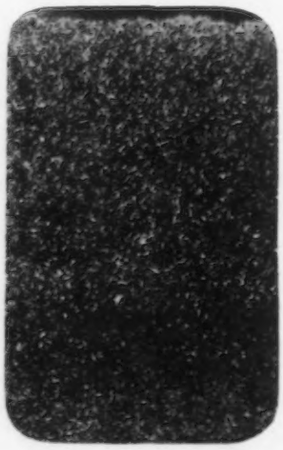


Fig. 12 — Nitralloy "G," Oil Quenched from 1650 Deg. Fahr., Tempered at 1000 Deg. Fahr., Nitrided at 950 Deg. Fahr., for 96 Hr. x 100

erties. Many instances of actual service tests might be mentioned. An instance of such a test in which the nitrided article showed great superiority over the material previously used involves an application in the shoe industry, where a small anvil receives the impact of two wires at the rate of 150 times a minute. Besides receiving this impact, the anvil is required to loop the wires. The life of this part has been increased many times by the use of nitrided Nitralloy.

Guillet* has studied the wearing properties of nitrided steel, especially with respect to the automotive industry. Some of the data presented by him are included in the following table:

Table of Wear of Cylinders

1. On car with cast iron cylinders after 30,000 km. (18,630 miles)..... 0.016 in.
   On car with nitrided cylinders..... 0.0008 in.
2. Aviation motor after 100 hr. running:
   Wear of cylinders of heat-treated steel..... 0.0032 to 0.004 in.
   Nitrided cylinders..... None
   Oil consumption (same conditions) per hphr.:

	New motor	After 100 hr.
Cylinder of heat-treated steel	4 to 5 grams (60-75 grains)	12 to 15 grams (180-225 grains)
Cylinder of nitrided steel	4 to 5 grams (60-75 grains)	4 to 5 grams (60-75 grains)

*Lecture to Academy of Sciences in Paris, France.

Some of the uses of nitrided Nitralloy are as follows:

Crankshafts	Cams	Ring Gears
Wrist Pins	Bushings	Celluloid Molds
Spinning Rings	Valves	Worms
Spindles	Timing Gears	Chucks
Pinions	Small Gears	Master Gears
Steam Nozzles	Clutches	Tappets
Camshafts	Gages	Steering Mechanisms
Piston Pins	Pump Shafts	Sectors
Relay Shafts	Rollers	Master Cams

In view of the properties of nitrided Nitralloy, the statement made at the beginning of this paper, that its development represents one of the most important metallurgical accomplishments in recent years, is well justified.

Qualities of Molding Sands as the French See Them

TECHNICAL requirements for molding sands are: (1) permeability of gases; (2) refractoriness; (3) freedom from generation of gas; (4) non-adherence to the metal, to which it must give a good surface, and (5) it must not temper nor harden the surface of the metal, says Marcel Guedras in *Revue de Fonderie Moderne*. These qualities depend upon the characteristics of the sand, the agglomerant, the preparation of the mixture and the drying.

An ideal sand comes from Fontainebleau, Nemours and Rouen, and also from Belgium. The sand from Fontainebleau consists of silica, 98.90 per cent; alumina, 0.20 per cent; lime, 0.12 per cent; magnesia, 0.10 per cent; combined moisture, 0.28 per cent, and oxide of iron, traces.

Grains of sand must be uniform in size, held together with an agglomerant which must be of uniform quality. Although these two requirements are of vital importance, many foundrymen do not appreciate them at their true value, says the author. Crushing of sand frequently destroys its value. Mixing should be dealt with by specialists as should also the construction of mechanical mixers. Each grain of sand leaving the mixer should be inclosed in a skin of agglomerant and this is impossible with a crusher.

The classic agglomerant, linseed oil, is not sufficient and various preparations of molasses, rosin, etc., are added, each foundry usually having its own formula. This problem alone often requires many years of patient research in the laboratory. In Germany agglomerants are prepared by specialized chemists by means of methodical tests which are able to guarantee the uniformity of their product. Foundrymen are thus relieved of a fruitful cause of anxiety, and are assured freedom from blisters and cracks in complicated castings which, in the absence of a satisfactory molding sand, it would have been impossible for them to undertake to make.

Steel Foundry Adds Electric Department

IN order to diversify more thoroughly its products in steel castings, the Union Steel Casting Co., Sixty-second and Butler Streets, Pittsburgh, has recently placed in operation an electric furnace which will supplement the several 25-ton open-hearth furnaces operated by the company. The installation will enable the company to furnish steel castings from 1 lb. to 70,000 lb., including all types of light section work and to meet the demand for alloy castings.

The new furnace, shown in the accompanying illustration, has a capacity of 4000 lb. every 2 hr., and is operated from 750-kva. transformers, stepping down three-phase 60-cycle, 11,000-volt current to 205 volts.

The molding machines are of the Herman pneumatic type, both straight jar and roll over, worked out on the unit system. One section of the molding floor is devoted to small work on squeezers and another section devoted to bench work.

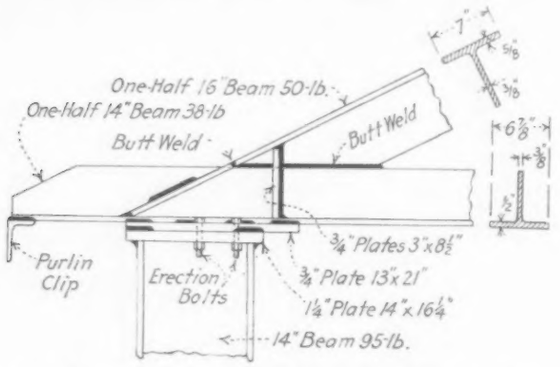
A large proportion of the castings are made in green sand molds. The finishing shop is laid out for straight line production and castings have continuous flow from each successive operation until ready for shipment. The finishing shop is equipped with a sandblast shop and full equipment for annealing and grinding.

Building Erected by Gas Welding

Use of Oxy-Acetylene Method in Factory Structure— Valuable Data Secured for Future Work Along Same Line

OXY-ACETYLENE welding has been used in fabrication and erection of a large factory building to be used for a research department at the Niagara Falls, N. Y., plant of the Union Carbide Co. This is believed to be the largest structural building that has been gas welded and the first of its type to be fabricated and erected under usual procedure of construction.

It is a mill-type, single-aisle building 75 ft. wide between column centers and 260 ft. long, with thirteen 20-ft. bays. The building took 298 tons of steel, of which 203 tons was shop welded and the remainder either field welded or bolted. Of the total amount welded about 75 per cent was done in the shop and 25 per cent on the field.



Details of Truss Heel Joint and Column Connection, with Welding Contacts Shown in Black

Following usual practice, bolts were used in joining such members in erection as would have been bolted had the building been riveted.

The building is 42 ft. 5 in. high to lower chord of trusses. Mezzanine floors 27 ft. wide extend along one side, single-stage in 11 bays and three-stage in two bays. The main and first mezzanine floors will be served by a full-span 10-ton traveling crane.

This is the first of a series of welded structures in contemplation for construction under the development section of the Linde Air Products Co. This type of building was selected for the initial product primarily because it contained a miscellany of structural joints and offered opportunity for a more general application of structural welding than would have been given in a multi-story structure. In addition, its erection would provide structural welding data for a number of types of industrial buildings.

It was decided for two reasons to handle the welded steel in a manner similar to that which would have been followed if the building had been riveted. First was the fact of existing construction facilities and consequent maximum speed of production. Secondly, it was desired to obtain practical experience with gas welding when applied to this class of structure under conditions similar to routine production and construction.

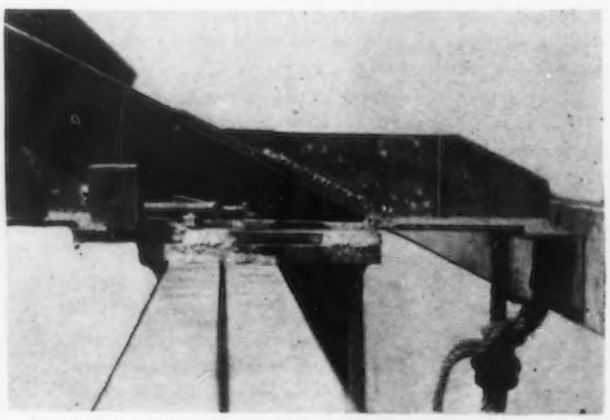
Designs for welding in general followed the lap method of assembly of parts, utilizing fillet weld. This was particularly true for truss web members and for beam-and-girder connection details. Exceptions were made at the heel and ridge joints of the trusses, where a combination of fillet and butt welding was utilized, and in anchorage details for principal columns.

Liberal use was made of Carnegie beam and column sections. Through elimination of built-up columns and girts, using in their place rolled single sections, and by placing assembly bolt holes in details wherever possible, the major tonnage had only to be gas cut or milled prior to transfer to the welding skids for jigging and attachment of details. As roof purlins and chord bracing would ordinarily not be riveted in place, these sections were not welded.

Each main building column consists of two milled beam sections, one 24 x 12 in. and one 14½ x 12 in., offset at the elevation of the crane beam. These sections were shop spliced by fillet welding 1-in. plates on the face of the column flanges, the inner plate being cut to straddle the web of the 24-in. column below the web joint. Base plates for columns were provided with anchor bolt holes before framing, so that they could be set and grouted before the columns arrived.

Anchorage for the columns is provided by double extra heavy pipe lugs, double-fillet welded to the edges of column flanges. Through these pipe members the anchor bolts are passed and secured by nuts. The columns are capped by bearing plates fillet welded thereto along the outer face of flanges. Bolt holes in these plates provided for field assembly, with corresponding holes in bearing plates welded to the under section of the bottom chord of the truss.

Bracketed plates are used for the crane beam seats, these beams, by offsetting the 24-in. columns, preventing direct bearing. The connecting details on the column for girts, lintels and beams were made of angles, providing landing seats and side connections where necessary. These details, provided with assembly bolt holes, were welded



How the Welded Heel Joint Appears After Completion, with Purlin Attached at Lower Right

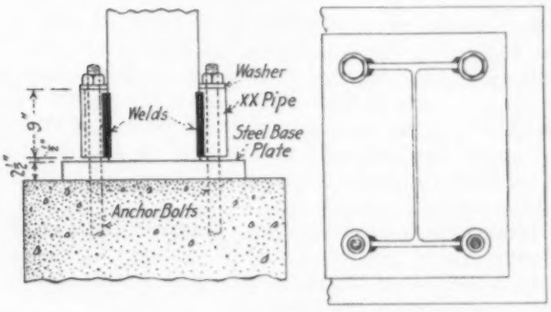
to the columns, thus avoiding shop work other than milling and welding on the column sections.

Trusses are 19 x 75 ft., designed to permit their welding in half-sections in the shop, thus keeping dimensions within shipping limits. Upper and lower chords were made from 16-in. and 14-in. beam sections, split longitudinally. This produced T-sections with sufficient leg length to receive the web members without using gusset plates. Where these T-sections meet at the heel of the truss the webs were butt welded in the shop, and at the ridge the flanges were butt welded in the field. At the heel the upper chord flange was extended to engage the flange of the lower chord. Web and knee brace members are angles secured by ⅜-in. fillet welds.

For floor beams flat flanges of beam sections were used wherever possible for landings, welded connection details being provided for beam ends only. In designing connections for beams and girders, 25 per cent was added to present floor loads to provide for possible increase; in addition, an increase of 100 per cent to the crane load will permit later installation of a 20-ton crane on the present runway.

Unit stress of 16,000 lb. per sq. in. was provided for the base metal design and for the weld metal design, 11,300 lb. for shear and 15,000 lb. for compression.

Welding in shop at the outset was somewhat slow, from unfamiliarity of the welders with this class of work,



Anchorage Design for Side Columns, Which Utilize Pipe Welded to the Column as a Means of Holding in Place

but later the rate increased steadily. Each welder was required to pass qualifying tests of the American Welding Society code. Smooth looking welds were not obtained in all cases, but as the job progressed this detail was improved. The trusses were assembled in jigs secured to the welding skids, in which the truss members were clamped for welding. Simple clamps were developed for shop assembly of details.

Field welding began in joining the half-truss sections on the ground. Bolts at the splice and ridge joints permitted bolt assembly of these sections. The assembled trusses were laid flat on blocks along one side of the aisle, each truss lapping the other, so that the welders could get at the joints. This procedure required one-half the welding on the trusses to be done overhead and is said to have demonstrated the feasibility of joining welded trusses on the field in a manner similar to that used with riveted joints.

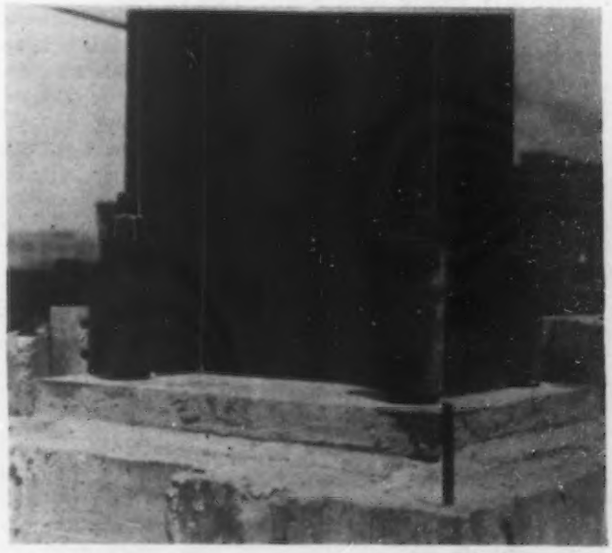
Time studies of the rate of welding were made during shop fabrication. At the start the average produced in a day of 9 hr. was about 180 in. for ⅜-in. fillet welds and 135 in. for ⅝-in. fillet welds. As the welders became familiar with their work these averages increased to 320 in. for the smaller weld and 245 in. for the larger. The total theoretical amount of welding was: ⅜-in. fillet welds, 2483 ft.; ⅝-in. fillet welds, 334 ft.; ⅜-in. open-butt welds, 69 ft.; ⅝-in. single-V butt welds, 35 ft.

On the basis of the rates of welding prevailing during

These Semi-Trusses Are Lying Upside Down. The connections between them are made at the right end (as here viewed)

the latter part of shop fabrication at improved production speeds the total number of man-hours would have been between 1300 and 1400. However, the man-hours actually consumed were about double this, the difference representing lost motion, time spent in developing the working crew, etc. It is estimated that, if advantage had been taken of the average oversize obtained in the specified standard fillet welds, and the excess strength developed thereby in the weld design been utilized, the theoretical amount of standard fillet welding would have been reduced by approximately 20 per cent. The average tonnage per welder per day was about 1.67 tons of material on which welding was performed.

It is estimated that the welding cost should not average more than $20 per net ton of shop-welded steel, exclusive of the cost of milling and cutting and punching opera-



Sections of Double Extra Heavy Pipe Were Welded to the Column Bases for Anchorage into Foundation. Use was made of H-beam sections for columns

tions and handling expense. This figure, based on a welder's rate of $1 an hour, includes setting-up expense in the welding department and 85 per cent overhead on labor. On the basis of total job tonnage, the shop welding cost would be reduced to approximately $13.70 a ton. This cost is offset by a saving in weight of steel, estimated by the company at approximately 10 per cent. As this saving amounts to about two-thirds of the shop welding costs, it brings the net shop cost for welded construction within the commercial range.

Electrical Engineers' Annual Meeting

Iron and Steel Men Have Extensive Exhibits of Equipment—Discuss Electric Welding and Use of Low-Heat Gases

EXHIBITS of electric and combustion equipment shown during the convention of the Association of Iron and Steel Electrical Engineers, at the William Penn Hotel, Pittsburgh, last week, attracted considerable interest and were inspected by several thousand persons. There were approximately 150 separate exhibits, a few of which included machinery in active operation. In addition to a wide range of electrical equipment, the exposition included iron and steel castings and forgings, conveying equipment, refractories, roller bearings, small tools and a wide variety of fabricated steel products of interest to steel mills.

Officers Elected

Officers elected for the coming year were: F. W. Cramer, Republic Iron & Steel Co., Youngstown, president; R. M. Hussey, Jones & Laughlin Steel Corporation, Pittsburgh, first vice-president; F. O. Schnure, Bethlehem Steel Co., Sparrows Point, Md., second vice-president; W. E. Miller, Bethlehem Steel Co., Johnstown, Pa., secretary, and James Farrington, Wheeling Steel Corporation, Wheeling, W. Va., treasurer.

Abstracts of some of the technical papers and reports were covered in THE IRON AGE of June 20 and below on this page. A paper by William O. Renkin, Combustion Engineering Corporation, New York, on "Application of Pulverized Fuel to Metallurgical Furnaces," will be abstracted in a later issue.

Status of Various Methods of Welding

THE electric welding committee presented a report June 17 at the annual meeting. At present, the committee says, electric metallic arc welding seems to be most commonly used in general repairs and in manufacturing processes where a variety of operations must be performed with the same tool. Thermit steel holds an unassailable position where large portions of metal must be replaced and where cast iron has to be repaired.

Gas welding appears best to fit thin material and the cases where an exceptionally smooth finish is required. Its competitor in this field is the atomic hydrogen arc, which is said to be a little less flexible than the gas torch for hand welding.

Where Each Form Is Best

While the metallic arc has the advantage over all other forms for speed in hand welding, for general repair work and structural welding, other forms show decided advantages in a manufacturing process where there is repeated application of one operation.

For manufacture of thin-wall pipe and conduit, progressive resistance welding seems to hold an undisputed field, which may be expanded indefinitely to include larger sizes and heavier walls, as the trade becomes more familiar with the art.

For other products, where sections of pipe are to be welded end to end or where pressed steel shapes are to join to form hollow members in machine construction, various forms of flash welding are adopted. This method is now in use for making double-length pipe, manufacturing automobile parts, etc., with great success and apparent satisfaction.

For this type the time required seems to vary more or less directly with the area of the section to be welded, and inversely with the current available, the voltage varying from 2 to 9, depending on conditions. The time required to make a weld with a properly proportioned equipment, using about 2500 to 3000 amp. per sq. in. section, will vary from less than 1 sec. to 15 sec. where a current density of not less than 250 amp. per sq. in. is used.

Strengthening Bridges Without Stopping Traffic

Two interesting applications of metallic arc welding in the Pittsburgh district during the past year were the building up and repairing in place of the floor beams and portions of the vertical structure of the Herrs Island Bridge, which has been in service 31 years, and the reinforcing of the body of the link bars on the Smithfield Street Bridge over the Monongahela River, without interrupting traffic.

One of the most interesting departures from standard riveting practice was the complete welding of a 10,000-ton battle cruiser by Germany at the Kiel yards, showing a saving in weight of 1000 tons.

Utilizing Gases of Low Fuel Content

DEVELOPMENTS in utilizing gases of low heating value were reported upon by the gas utilization committee at the annual meeting at the William Penn Hotel, Pittsburgh, on June 19. The greatest development reported was an increased realization in the value of gas as a fuel. Ease of control and attainability of high efficiency have led to a series of campaigns to conserve gas of such low heating value as that from blast furnaces, and to a more extensive use of gaseous fuel.

This campaign has led to development of better appliances for burning the gas, particularly in the way of burners and recuperators. It has led also to utilizing blast furnace gases for purposes other than heating of the hot blast stoves and power for blowing engines.

Analyses of values have shown that blast furnace gas has a far higher value as a metallurgical fuel than as a boiler fuel. In some instances it was found worth twice as much for metallurgical purposes, even when enrichment was required. Several installations have been made using this gas mixed with a gas of higher calorific value. Installations are contemplated in which this gas will be used straight, reliance being placed upon recuperation in attaining the desired flame temperature.

This method of utilizing blast furnace gas has been greatly facilitated by the development of control devices and recuperators and by a decrease in the cost of more effective gas cleaning.

There has also been developed recently a tar gasifier to produce a gas of very high calorific value, for the enrichment of leaner gases, as well as for the conversion of pitch into the more accurately controllable gaseous fuel.

Cost of Semi-Continuous Wire Drawing

Experience with Morgan-Connor Machines at Portsmouth Works of Wheeling Steel Corporation

IN April, 1923, the Wheeling Steel Corporation began operations in a new rod and wire mill at the Portsmouth works. Most of the production is run from regular low-carbon basic rods, although special orders requiring special steel are frequently handled. The wire drawing equipment installed at the present time includes a total of 203 blocks. Forty-eight of these blocks are on 12 Morgan-Connor Type A semi-continuous wire drawing machines furnished by the Morgan Construction Co., Worcester, Mass.

The twelve Morgan-Connor machines are of the 22-in. size, with four of the usual single-draft blocks on each machine. Rods are placed on the tilting floor reel at the input end of the machine in coils, usually of 300 lb. Each machine is powered with a 40-hp. direct-connected direct-current motor designed to give a wire speed of about 700 ft. per min. at the fourth block.

There is one man on a 10-hr. turn for each two machines. The machines start and stop in response to pressure on a control bar which extends along the entire length of each unit and which acts as a safety stop in case the operator should be caught and drawn toward the machine. A floor stop on the tilting reel at the input end of the machine is a further safeguard, stopping the motor instantly should the wire become abnormally taut for any reason. An experienced operator can thread a machine in 3 min.

Low-carbon basic rods supplied to the Morgan-Connor machines are of No. 5, pickled in sulphuric acid to remove the scale, given a clear water rinse, and then lime coated before oven drying. Reductions to No. 11 or No. 11½ are made in three drafts, with the first block not in use. Reductions to No. 12, 12½, 13, 13½ and 14 are made in four drafts. The three sizes which constitute the bulk of the production and concerning which cost and operating data are available are No. 12½, 13 and 13½.

The following tabulation will indicate the production rates per man on the three wire sizes most commonly run. The averages are based on the records of several operators and cover a number of turns, in each case, during which the production was confined to a single size of wire only.

Wire Size	Production Per Man Per Turn, Lb.
12½	12,778
13	12,916
13½	11,212
Average	12,302

The accompanying table has been set up to show the operating cost of one of the Morgan-Connor machines. Depreciation and average interest at 6 per cent have been figured on the basis of a 20-yr. life. Floor space, charged at an estimated rental value of 50c. per sq. ft. per year, completes the itemization of fixed charges, giving a total of $802.26 per machine per year.

The variable operating costs consist of maintenance and repairs, machine lubricant and electric power. Repairs, including labor and material, have been divided into electrical and mechanical classifications. The latter includes replacements of dies, block repairs and general machine repairs. The usual chilled iron die is used on the Morgan-Connor machines. Each die hole is ordinarily good for one bundle of rods. In calculating the average figures, the year's repair cost total for the wire department has been reduced to a per block basis for mechanical, and to a per drive basis for electrical, repairs.

Maintenance was handled in the same manner, this including all cleaning, inspection and oiling labor.

This method of handling repair and maintenance charges is considered equitable, as the operating department has found that the cost of mechanical repairs per block with the semi-continuous machines is about the same as with the individual benches, and that the cost of electrical repairs is about the same per drive.

The determination of power is based on meter readings taken during the various stages of machine operation. The first block reduced from 5 to 7¼ and took 45 amperes at 227 volts. d.c. The second block reduced from 7¼ to 9¼, taking, with the first block, 72 amperes. The third block took the wire from 9¼ to 11, with a total consumption of 105 amperes. The final block reduced from 11 to 12½ and the machine drew a total of 145 amperes with the last block running at 126 r.p.m. Normal operation keeps the machine operating at approximately 79 per cent load, or at an average input of 105 amperes at 227 volts, or 23.8 kw.

The total of all machine operating costs on one Morgan-Connor Type A unit is $1,760.41 per year. On the basis of 419 turns operated, the machine cost per turn is $4.20.

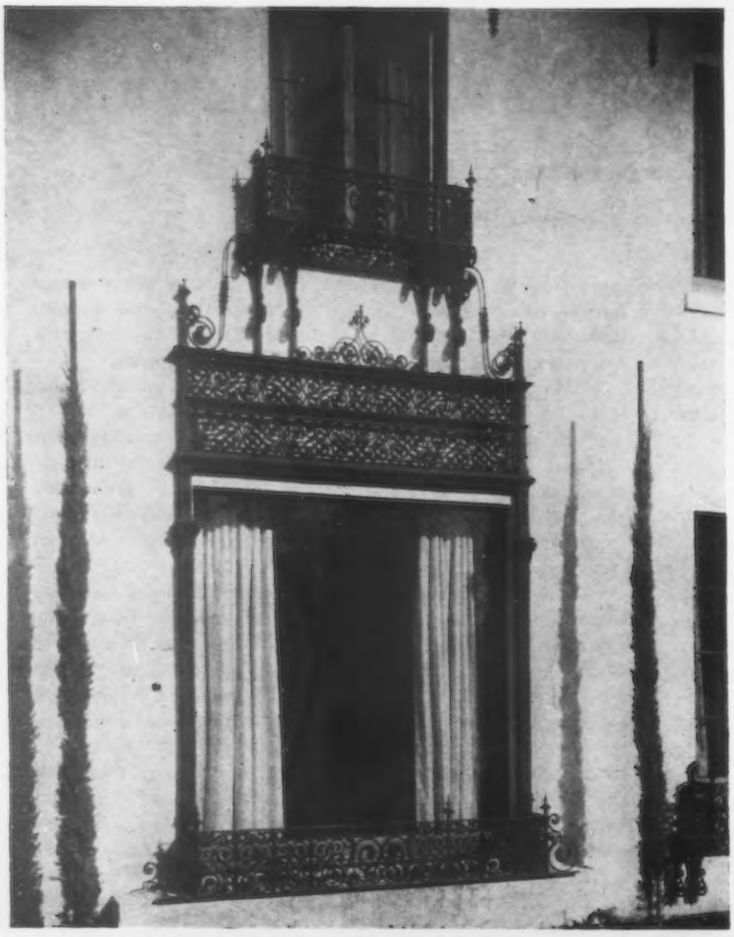
Unit drawing cost is shown for the three sizes of wire most commonly handled and also as an average for these three sizes. The total unit drawing cost for No. 12½-gage wire is $1.62 per 1000 lb.

The information contained in the foregoing comes from a survey made by the A. C. Nielsen Co. in collaboration with C. C. Caudill, general manager of the Wheeling Steel Corporation, Portsmouth, Ohio.

Wire Drawing Costs by Morgan-Connor Method

Annual charges		
Fixed:		
Depreciation (on one machine, installed complete) $7,083.00 ÷ 20-year life		$354.15
*Average interest @ 6 per cent (21/20 x $7,083.00 x .06/2)		223.11
Floor space: 450 sq. ft. @ $.50/sq. ft./year		225.00
Total		$802.26
Variable operating:		
Maintenance (labor for oiling and inspection)		
Mechanical ($12.28/block; 4 blocks)	$49.12	
Electrical ($67.26/drive)	67.26	
		116.38
Repairs (labor and materials, including dies)		
Mechanical ($52.03/block; 4 blocks	$208.12	
Electrical ($68.12/drive)	68.12	
		276.24
Lubricant ($16.73 per block; 4 blocks)		66.92
Power (238 kwhr./turn; 419 turns; $.005/kwhr.		498.61
Total cost per machine, per year		$1,760.41
Per turn (419 average)		$4.20
Unit drawing costs		
Totals, per 1000 lb. wire:		
No. 12½ gage	$1.62	
No. 13 gage	1.61	
No. 13½ gage	1.85	
Average for above three sizes	1.69	

*Allowing for interest earned by depreciation reserve.



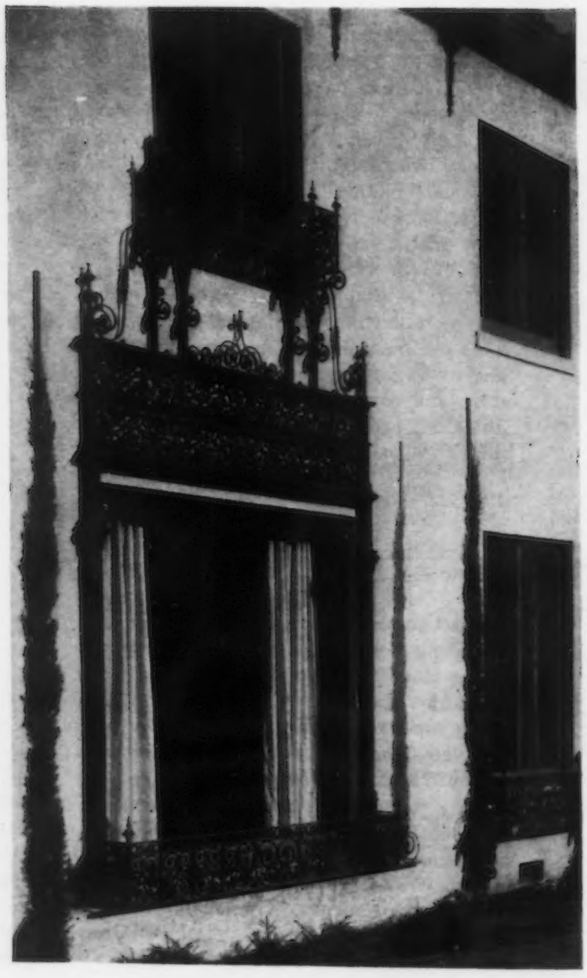
Ornamental Metal Steel

A PROCESS of manufacturing ornamental metal by means of electric steel castings, supplemented by welding operations, has been developed by the Kay-Brunner Steel Casting Co., Los Angeles, Cal., and the finished product has the outward characteristics of hand-wrought iron.

For ornamentation of doors, windows, fireplaces, staircases, etc., a variety of artistic designs, taking their motif from medieval times, has been worked out. The results are shown in the accompanying illustrations.

The Kay-Brunner Company describes the process as one of extreme simplicity. The architect traces the motifs that he desires reproduced; he specifies dimensions and other details that he desires copied. A photograph, etching or sketch, or a bit of detail from a magazine page, may be used as a basis.

Craftsmen then model these designs

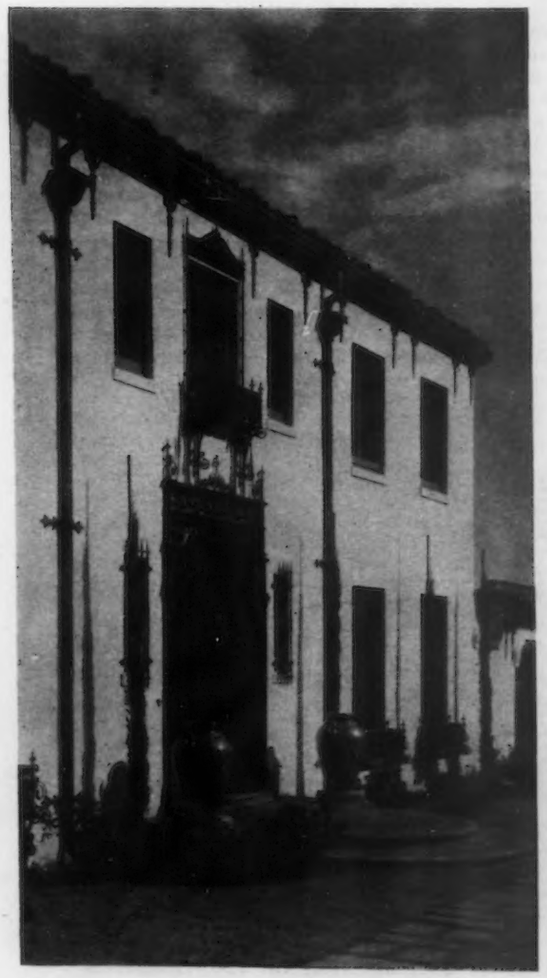


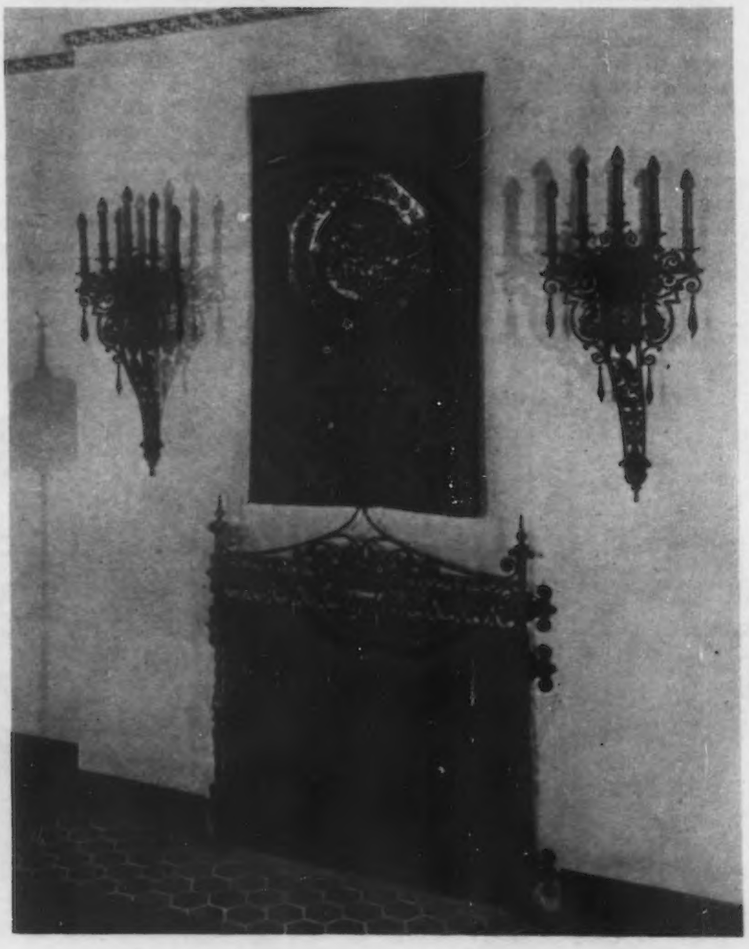
Produced in Electric Castings

on smooth-grained mahogany. Every detail is tooled by hand. The model, being hand-carved throughout, has all the individuality of any other personal creation. The men in charge of this detail were trained in European schools.

From the model thus produced, the metal is cast of electric steel made in a furnace designed by Lloyd D. Kay. When ready for assembly, the various parts of a decorative detail are joined by electric welding. This welding is so performed that no joint is visible when the work is completed.

Various simple heating or acid treatments give the metal any aged effect or any texture typical of any ancient schools of metal workers. When colors are desired, they may be provided. Permanent color effects, ranging from a bright lacquer to a dull polychrome or powdery Roman gold, have been successfully developed in this work.





New Pig Iron Containing Alloys

Silvery Mayari Iron Developed Having Manganese and Silicon Besides Nickel and Chromium

CONTINUED search for methods of improving iron castings, in order to combat the inroads being made by competing materials, has led foundrymen to use different alloys with varying success, together with steel scrap. The extent of this development was reviewed at some length in an article entitled "Ascendency of Alloy Iron Castings," in THE IRON AGE, March 28.

The high-test irons of Europe, with their low-total carbon content, have not been very successfully reproduced in this country, owing probably to our high-total carbon pig irons. European irons are generally much lower in carbon, caused perhaps by lower temperature blowing. Meanwhile, following the use of Mayari pig iron by iron foundries for making high-test castings, the Bethlehem Steel Co. has recently developed a new pig iron of a similar nature. It is known as Silvery Mayari pig iron. It has grown out of endeavors to make a low-carbon pig iron with Mayari ore and to make the silicon and manganese content high enough to permit the use of sufficient steel scrap to produce a high-test cast iron without requiring expert control.

This Silvery Mayari iron, it is stated by the company, has proved better than the combination of ordinary silvery pig iron with Mayari iron, as the control of the total carbon is combined with the elimination of the so-called kish crystals of graphite. Sound and close-grained castings in heavy sections have been made, with much higher silicons than had been thought possible. This, it is contended, is caused by the combination of the ores used, as well as by the alloys inherent in them.

In tests made at widely separated foundries, samples of castings from the new iron have shown in every case the same structure under the microscope, according to one of the foundry engineers of the Bethlehem organization. The graphitic carbon is broken up into rounded nodules instead of remaining in the flake, or plate, form, and a true pearlitic formation is revealed. It is well-known that the closer the eutectic graphite is approached, the stronger the iron becomes, and at the same time the machining of the iron becomes more difficult.

By the use of Silvery Mayari iron, it is thus claimed, hard castings are avoided, the iron having the same Brinell hardness in the center of a 4-in. cube as in castings of ⅜-in. sections. The testimony of a Diesel engine builder is offered to the effect that the total carbon content averaged 2.85 per cent and the silicon 2.65 per cent during 10 days' trials. The Brinell hardness was 192 and the tensile strength, 45,000 lb. per sq. in.

Photomicrographs of an ordinary gray iron casting, compared with iron from castings made with 10 per cent Mayari iron and with castings made with additions of the new Silvery Mayari iron are shown in the accompanying reproductions, Figs. 1, 2 and 3. The long flakes of graphite in the ordinary casting are easily recognized; these have been made much smaller by the use of 10 per cent Mayari pig iron (Fig. 2). In the case of the addition of new Silvery Mayari, the structure is revealed as showing an elimination of the flakes of graphite which are now in the nodular form.

Silvery Mayari iron is made with a carbon content of 2.50 per cent maximum, a silicon content of 7 to 10 per cent, a manganese content of 2 to 2.50 per cent, and the phosphorus percentage at 0.10 per cent maximum. The proportion of nickel to chromium in the new iron is in the same natural ratio of one to two as in the case of the regular Mayari pig iron, except that Silvery Mayari has about one-half of the standard Mayari contents of these metals. The Bethlehem company has issued a pamphlet entitled Booklet 54, describing the use of the new iron in general iron foundry practice.

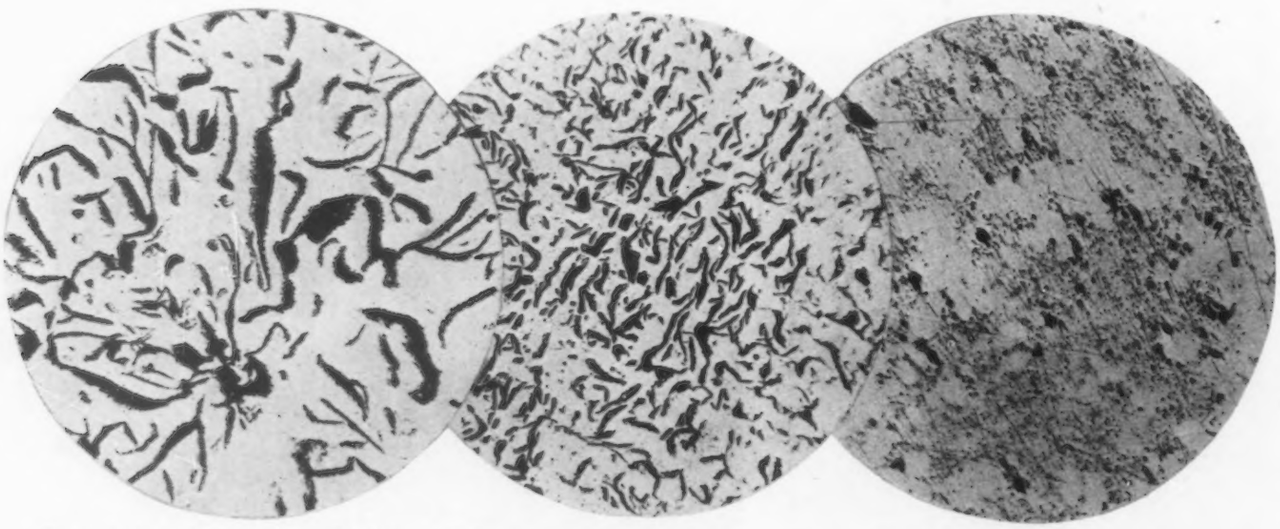
Straight-Line Production for Aircraft Plants

The rapidly increasing production schedules of aircraft and accessory manufacturers have made modern straight-line production absolutely necessary in their plants, the Austin Co., Cleveland, airport engineers and builders, says in the third edition of its booklet, "Airports and Aviation Buildings."

The booklet, which has just been published, is a comprehensive discussion of the problems of the ground end of the aviation industry. It is generously illustrated with photographs of many of the scores of airports designed and constructed by the company's engineers, in addition to hangars, passenger depots and aircraft factories.

According to the Austin Co., the assembly lines in the more modern airplane factories compare favorably with the most up-to-date automobile plants. Descriptions are included of wind tunnels and other buildings housing apparatus for research work in connection with airplane manufacture.

As a result of a request from the War Department, the chief coordinator has arranged for the preparation by the Bureau of Standards of a classified list of all Governmental laboratories and other facilities available for the testing of supplies and materials for the purchasing officers of the various Government departments, the Department of Commerce has announced.



Figs. 1, 2 and 3 (Left to Right)—All Represent Unetched Specimens at Magnification of 100 Diameters

Trade Customs in Sale of Sheets

American Rolling Mill Co. Publishes Booklet Informing Buyers of Their Rights and Responsibilities

TRADE practices which have been in general use in the flat-rolled steel industry are set forth in a booklet printed for distribution to the trade by the American Rolling Mill Co., Middletown, Ohio. In explaining the purposes of the booklet, the company states that the extensive use of sheets and strips for special jobs and for new requirements has emphasized the need for a clear understanding of trade customs which are mutually agreeable to buyer and seller.

Uniform practices in the industry are described in part as follows:

Stretcher Straining

Stretcher strains may be caused by ageing of the sheets, temperature of the sheets, variation in the use of die lubricants and the manner in which the sheets are drawn, over all of which the supplier of sheets has no control. Proper roller levelling will usually correct straining, and when necessary, sheets should be roller levelled just prior to being drawn.

Since roller levelling is considered a necessary operation of the fabricators, the responsibility for any costs or charges for this operation rests with the fabricator. If, however, the fabricator has endeavored to use material on an established job, and has applied proper roller levelling and the material stretcher strains, then rejection and salvage of the material will be subject to negotiation.

Breakage Tolerance

Until the drawing operations of any individual stamping have been properly developed to produce suitable stampings for production runs, full absorption of breakage loss must be assumed by the fabricator.

When material has been ordered in a proper grade of deep drawing or extra deep drawing, and a full opportunity is given to the supplier to understand the hazards to be met, then the fabricator is entitled to protection against breakage loss under the following conditions:

After the blanking size has been properly developed, and the dies are approved for production and the processes are standardized, then a breakage tolerance shall be established over which the supplier of the sheets will be responsible. This breakage tolerance, beyond which the supplier will stand, varies with each individual job, and must be determined by the nature and severity of the requirement.

It has for a long time been the general practice for the buyer to absorb breakage up to and including 3 per cent of the sheets run; that is, the buyer will absorb that percentage for breakage on ordinary drawing or stamping operations. It is recognized that besides the naturally slight variation in the steel, there are many things to cause breakage, such as die lubrication, hold-down tension, press stroke, scored dies, improperly placed blanks, temperature of sheets, etc.

There are many requirements which make it necessary for the supplier of sheets to be allowed more than 3 per cent for breakage. Many jobs have been established with a breakage tolerance of 5 per cent, some 10 per cent or even higher, depending upon the nature of the drawing or stamping operation.

As new and difficult drawing jobs develop, it is necessary to determine what percentage of breakage the user of sheets should stand. In such cases, the supplier should not be responsible for any breakage until a run has been made after the dies have been properly adjusted, and a sufficient number of sheets drawn to ascertain the results which will be obtained. The result of this run will determine the percentage of breakage the fabricator will stand and such tolerance will then be continued until the user gets better results with the drawing or stamping in question. For instance, if the best practical result is 15 per cent breakage, the supplier should be allowed that figure until less breakage is obtained.

Under no conditions, however, should the supplier be responsible for breakage of 3 per cent and under.

In some cases in developing a new stamping where irregular results have continued over a period, it is desirable for the buyer and seller each to stand one-half of the breakage in excess of the best previous run of sheets. The supplier will be glad to consider this plan at any time the fabricator is interested in negotiating on this basis.

Breakage tolerance is to be computed on quantity production of a continuous run which may cover a weekly or monthly period, or be based on a minimum quantity of a carload of sheets.

Whenever the breakage exceeds as much as twice the normal breakage tolerance on any part, the supplier should be immediately notified before the run is continued or the responsibility shall rest with the user.

The same tolerances which apply to breakage apply also to stampings rejected as unusable for any other cause, with the exception that the supplier accepts all responsibility for laminations.

Stampings Rejected for Various Causes

When stampings or drawn parts are rejected, as unusable, for causes other than breakage, rejections shall be considered on the same basis, and along with rejections for breakage. (Such rejections are termed "bad metal" by some users.)

Sheets may develop defects during the drawing operations, such as coarsening of surface; buckles, or lumpy areas, to a degree that the user would be justified in rejecting them provided the dies are properly adjusted, lubricated, etc. Whatever breakage tolerance is established will, therefore, apply to the combination of the rejections both for breakage and other defects.

Stampings rejected due to laminations should be so listed and credit will be allowed the user by the supplier of the sheets.

Sheets Ordered by Test and Treatment

When a buyer desires a definite, finished, fabricated result from the use of sheet steel, there should be the least possible stipulation on the supplier as to how the material must be made. The analysis and treatment required from one type of process to give the necessary finished result can readily be different from that required by some other process.

When there is the hazard to be met of supplying material to chemical specifications, then the sheet producer cannot in addition assume the hazards of meeting physical tests and workability results.

Similarly, when hazards of physical specifications have to be met there should not be imposed upon the supplier the additional hazards of meeting chemical analyses and workability results.

When a buyer specifies a definite treatment which the supplier must follow, then the responsibility for the developed characteristics of the sheets from such treatment shall be assumed by the buyer.

Sheets Ordered for Specified Purpose

When sheets are ordered without the purpose being shown on the order, the responsibility for the material being satisfactory for the part for which it is to be used, must be assumed by the buyer, provided the sheets are up to standard for the grade ordered.

When sheets are ordered for a definite requirement and then used for a different purpose, the responsibility for such sheets being adaptable for the latter rests upon the buyer, provided the sheets would have been suitable for the requirement for which they were originally bought.

If the sheet manufacturer authorizes the use of an item for a part other than for which it was purchased, then the responsibility for such sheets being satisfactory for that part rests on the sheet producer.

Annealing by Buyer

Steel suppliers cannot logically assume responsibility for material working satisfactorily after it has been annealed by the buyer. The sheet producer assumes responsibility only up to the point at which the buyer anneals, because the successful working of the material after it has been annealed is dependent entirely upon the character of the buyer's annealing practice.

Off-Gage Material

It is the general practice prevailing with buyers of flat-rolled steel for stamping purposes, to specify thickness in decimal parts of an inch.

Such practice imposes on the steel supplier the necessity to roll the material to as near the mean thickness ordered as possible, and it grants to the buyer the privilege of rejecting any steel which micrometers beyond the commercial thick-

ness tolerance allowed for the grade and size ordered.

Inasmuch as commercial rolling practice does not permit the producer to micrometer every piece, and inasmuch as the selling price does not include micrometer inspection of each piece at the mill, the responsibility for such thickness inspection is on the user. It is a standard practice at many stamping plants to perform this thickness inspection. Such pieces as the buyer finds are beyond the thickness tolerances agreed upon, are subject to rejection.

Car Loading

In shipping sheets, it is necessary to load and brace material to insure the sheets reaching destination in satisfactory condition. It is particularly necessary to go to unusual means to pack and brace high-grade flat rolled material, such as full finished sheets. Various methods of loading and bracing are in use, depending upon the method the shipper or the consignee has found best from his experience, or that has been recommended by the railroads.

If any method other than those approved by the railroads are used, the responsibility for any damage to the material enroute must be assumed by the shipper or consignee, depending on which one has specified the particular method of loading.

Shipment of Overage

It is understood that the producer of individual orders shall have the privilege of shipping overage to the extent of 10 per cent of the order. The hazard of mill practice necessitates an over-production on the mills to insure completing the order as closely as possible, on various items. Inasmuch as the percentage of loss in manufacture varies, it is practically impossible to produce an accurate number of prime sheets, necessitating the privilege of shipping in general up to 10 per cent overage.

Sheet Counts: Recognizing the possibility of error in count as to the number of sheets, the determining factor in the settlement of the invoice shall be the weight of the material.

Weight Difference: A variation of ½ of 1 per cent is recognized between weighings of different scales on account of kind and type used, accuracy of scales, location of scales and the personal equation in weighing.

Returned Material: When material is rejected at a user's plant and returned to the mill, there are no allowances made for any labor to the buyer for reloading and bracing the material. Such expense is recognized as proper cooperation between the buyer and his source of supply.

Rejected Material: When material is rejected at a user's plant for surface defects, flatness, off-gage, camber, workability, etc., it is recognized practice for fabricators to notify the supplier of the quantity rejected and to hold such material on their floor until disposition of the material is given them by the supplier. Such disposition must be given promptly.

The Moon Motor Car Co., St. Louis, has changed its name to the Windsor Corporation, in line with the change in name of its automobile, the Windsor White Prince. The company also has contracted to manufacture cotton pickers for the American Cotton Picker Corporation, the deliveries of which will begin Aug. 1. C. W. Burst is president of the Windsor company.

Migration of Industry Not Great

Relocations Few, Survey Discloses—Middle Atlantic States Lead in Number of New Plants

MIGRATION of industry, contrary to popular belief, is a relatively small factor in our economic growth, according to facts disclosed by an industrial development survey made by the Metropolitan Life Insurance Co. in cooperation with the National Electric Light Association. The study covered 2084 communities, representing 75 per cent of the total urban population of the United States and two-thirds of that of Canada.

In an address disclosing the findings of the investigation, at the fifty-second convention of the electric light association, June 7, James L. Madden, third vice-president of the insurance company, stated that relocations accounted for only 9.4 per cent of the plants gained by the various communities surveyed.

The real industrial development came from new industries started within the communities themselves. These represented 81.8 per cent of the plants gained. Branch plants were responsible for the remainder of the gains and accounted for 8.8 per cent of the total plants and 25 per cent of the total employees gained.

The Middle Atlantic States, consisting of New York, New Jersey and Pennsylvania, showed the greatest gain from relocations of industry. The New England States were second and the East North Central States—Ohio, Indiana, Illinois, Michigan and Wisconsin—ranked third.

The Middle Atlantic States also showed the largest increase in branch plants and in new local plants. New England stood second in the establishment of local plants and the East North Central States were second in the number of branches started.

Markets, labor and transportation are the three most important factors, in the order named, determining the location of new plants. "It is significant," said Mr. Madden, "that bonuses, free taxes, free land or free factory buildings—which inducements at one time were frequently offered and from time to time still are—do not appear among the three reasons most frequently advanced for the selection of the location of a plant."

Taking a population of 50,000 as a dividing line between the larger and smaller cities, the branches and relocations were divided nearly equally between these two classes of cities, but approximately three-fourths of the new local plants were established in the larger cities. All types of plants established in the larger cities accounted for 58.4 per cent of the total gains in employment reported in the survey.

While the larger cities are still getting most of all new plants, a tendency in favor of the smaller cities is to be noted. Growth of the industrial suburban towns around the larger cities is a reminder of this trend. One significant fact is that in the South Atlantic territory 40 per cent of the total gains in all plants is to be found in communities of under 10,000 in population. Analysis of the relocations in the nine geographical areas indicates that the preponderant movement was from the larger to the smaller cities except in the West North Central, West South Central and the Pacific Coast territories. While the reasons for the movement to the larger cities within these three areas vary, "markets" is the outstanding one.

Simonds Economic Contest for 1929 Announced

"The Federal Reserve System and the Control of Credit'" will be the subject of the 1929 economic contest of Alvin T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass. Since 1921 Mr. Simonds has awarded $1,000 for the best essay and $500 for the second best on a selected economic topic for the year. The contest is open to any one, and the essays submitted may be of any length.

It is suggested that the contestants compare the relative merits of the English banking system and its control of credit with those of our Federal Reserve System, and that they also make a study of the part that the cost of credit plays in advancing and retarding welfare and prosperity. Essays must be in the hands of the Economic Contest Editor, Simonds Saw & Steel Co., by Dec. 31. Those interested in competing are requested to write for the rules governing the contest.

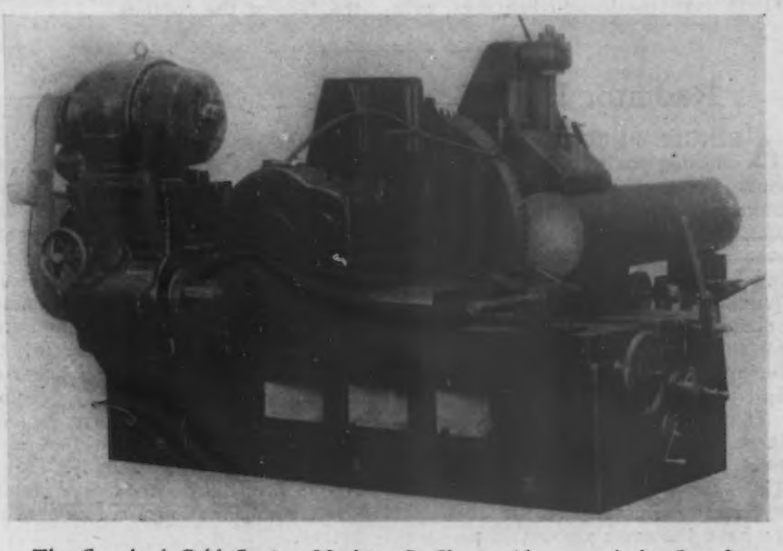
In announcing this year's contest, Mr. Simonds said:

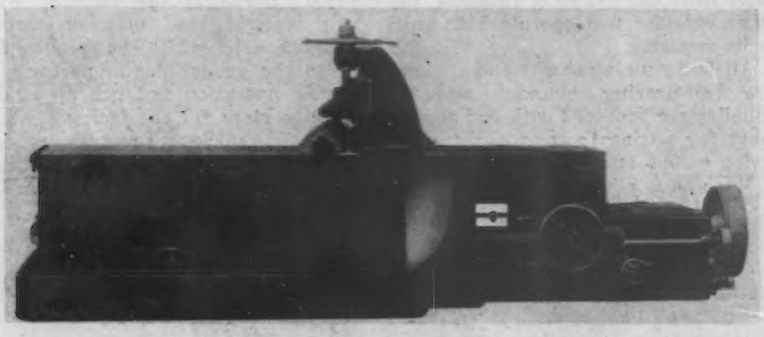
About the middle of 1927 the Federal Reserve discount rate was lowered from 4 to 3½ per cent. It is claimed by some that this was an unjustified rate and was so low that it was the primary cause of the great increase in stock market speculation which followed. Early in 1928 the Board increased the rate from 3½ to 4 per cent; shortly after that from 4 to 4½ per cent, and in the middle of the year to 5 per cent. In February, 1929, the Federal Reserve Board inaugurated a movement that it hoped and expected would check the increasing absorption of credit in stock market speculation and remove the likelihood of a further increase in the rates of money for industrial and commercial purposes.

There are probably few, if any, economic questions in 1929 of more importance than Federal Reserve System control of credit. Economists are rather generally agreed that the establishment of these rates should not be left to laissez-faire.

Cold Saws for Heavy-Duty Operation

HIGH efficiency is claimed for the Heller cold sawing machine illustrated, seven sizes of which, with capacity for cutting rounds up to 20 in. in diameter, are being marketed by the Steinle Turret Machine Co., Madison, Wis. Special adaptations of the same machine can be furnished for cutting crankshafts, for frog and switch work and for straight and miter cutting of iron and steel sections.





The Standard Cold Sawing Machine Is Shown Above, and the Saw for Frog and Switch Work Below. In addition to wide range of sizes, special types for rail, sprue and other cutting-off operations are offered

Intended for heavy-duty work the machine is equipped with steel gears and ball bearings throughout and has a long saw carriage bearing. The final saw arbor drive is through worm and gear, the worm wheel of which is one-half the diameter of the saw blade, and a 2 to 1 herringbone gear unit, giving a smooth drive. The saw blade cuts the stock on the upward motion, the stress of the cut being taken against the bed of the machine.

Four blade speeds and five feeds are obtainable through selective gearing. Control of the feeds is from the operator's position at the front of the machine, and feeds can be changed while the blade is under cut. A clutch is provided in the feed train as a safeguard against excessive pressure that might damage the saw blade or the machine. Adjustable feed trips are provided, and at the completion of the cut the saw carriage returns to the starting position automatically at a rapid rate.

Stock is fed to the stock stop mechanically by a roller arrangement which is brought into contact with the bar by a slight pressure on the control lever. The bar to be cut is carried upon a roller bar carrier that travels on a track at right angles to the machine. Clamping of the stock is facilitated by means of a "hammer type" clamping wheel.

The drive is through single pulley direct to the change gear box, the gears in which run in oil. When motor driven, the motor is mounted on the top of the gear box and the drive is through belt with idler pulley arrangement to secure proper belt tension. A deep sump for cutting compound is built integral with the machine base, the coolant being pumped to the point of cut through a double pipe lead. A special chip removing device is provided to eliminate adhering of chips to the saw teeth after the latter pass through the cut.

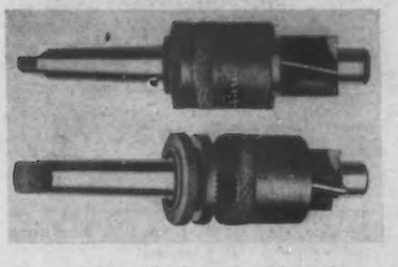
The Heller segmental type saw blades employed are made up of a heat-treated steel center disk to the periphery of which a set of high-speed steel segments is riveted. To assure proper alinement under severe cuts these segments are milled or slotted to fit directly over the shouldered edge of the disk. Each segment comprises four cutting teeth, alternate teeth being of beveled roughing type or square finishing type, which is said to split the chip into three parts and relieve the strain at the point of cut.

Important dimensions of the smallest and largest machines, designated as the No. 00 and the No. 5, respectively, are: Diameter of saw blade, 10 and 52 in.; capacity rounds, 1¾ and 18 in.; capacity squares, 1 5/8 and 16½ in.; capacity I-beams, 3 x 2 and 30 x 14 in.; motor, 2 and 25 hp.; and weight, 800 and 19,000 lb.

Automatic grinders for sharpening the blades are furnished in three sizes to accommodate the range of blades.

Stop Collar Holder Adjusted Quickly by Hand

ADJUSTMENT of the collar bushing may be made quickly by hand, without the use of wrenches, hammers or punches in the stop collar holder illustrated, which is being offered by the Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Avenue, Detroit, for use when counterboring, spotfacing, countersinking, or core drilling to a specified length. The adjustable collar stops against the top of the fixture bushing or against the work being machined, and regulates the depth of the cut or travel.



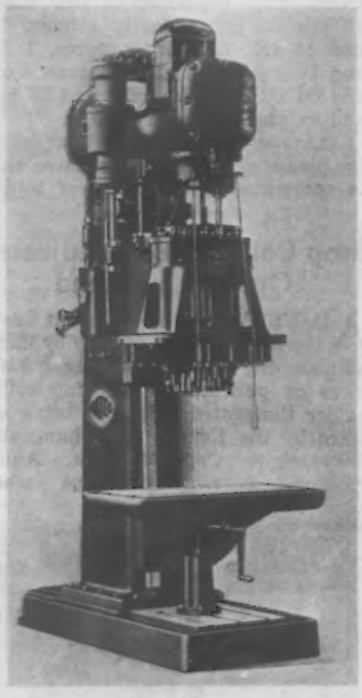
Stop Collar Holder, Quickly Adjustable by Hand, for Use in a Drill Press. By changing to a straight shank, the tool may be used in turret lathes

The collar is adjusted up or down by backing off the upper locknut, lifting the drive washer, turning the stop collar to the desired position and then lowering the drive collar and turning down the locknut. A slight pressure of the locknut on the drive washer, when engaged with the stop collar, serves to lock all the parts solidly in place on the holder. The tools are made in a range of sizes for use with Eclipse standard and special counterbores, core drills and other tools. Patents have been applied for.

Three new pump models have been brought out by the Tuthill Pump Co., 131 West Sixty-third Street, Chicago. These are modified forms of previous models and are designed to be built into the construction of a machine tool, to provide it with lubricating coolant or hydraulic service.

Multiple-Spindle Drill with Hydraulic Feed

AN adjustable-spindle driller with hydraulic feed, designed to cover a large variety of work, has been built by the National Automatic Tool Co., Richmond, Ind. Three types of heads may be had: 12 by 18 in. or 16 by 24 in. rectangular and 18 in. round. The latter is arranged for 12



Independent Change of Spindle Speeds May Be Had in This Machine if Desired

spindles while the others may have either 22 or 24. Independent change of speed of each spindle is a feature, although a single speed may be had if desired. Each type has a neutral position for those spindles which are not in use.

The column is very heavy, of box section type. The ways supporting the head are 12 in. across and have a bearing 2½ in. wide and 1¾ in. deep. The table is of the adjustable-knee type with 22 in. minimum height of working surface and 17¼ in. adjustment. It is raised or lowered by means of a removable crank which turns the adjusting screw through a horizontal shaft and bevel gears. The table working surface is 23 by 40 in. It is surrounded by a lubricant channel, and has two T-slots running lengthwise for clamping purposes.

Hydraulic feed is an outstanding feature of this machine. Two 5-in. low-pressure oil cylinders are mounted on heavy brackets at top of column. Maximum combined pressure from these cylinders is 8000 lb. and is applied directly to the head flange. Control of the feed is simple and positive. Adjustable trip dogs automatically control the rapid down, rapid up, feed and stop movements.

Pump and oil reservoir are located respectively on the column and in its top. A constant-speed pump is used, driven through a gear from the machine drive shaft. It has a by-pass to allow excess oil to return to the reservoir on reaching a given pressure. This also protects the drills should an unusually hard spot be struck, as the pressure cannot be built up beyond that for feeding.

Direct motor drive is furnished. This is applied through a horizontal shaft, mounted in ball bearings, to a train of heavy heat-treated alloy steel change gears and then to the head through a set of heavy heat-treated alloy steel spiral bevel gears. All gears are hardened and run in oil.

Floor space required for this machine is 34 by 85 in. The height with head up is 139 in. The weight is 11,000 lb. Feed by power ranges from 0 to 15 in. a minute, rapid traverse being 90 in. a minute. Maximum travel of the head is 19 in., while the center of the head is 15½ in. from the face of the column.

Radiator Loop Boring and Facing Machine

A SINGLE-PURPOSE radiator loop boring, facing and tapping machine has been designed and is being built by the Moline Tool Co., Moline, Ill. It handles radiator loops for steam or hot-water heating of buildings, and weighs about 15,000 lb. These machines are made with four spindles and can be arranged to have all spindles boring and facing, or all facing and tapping, or half boring and half tapping.

In general the machine consists of a large bed with V guides for the two rails which carry the spindle units. These rails, gibbed, are actuated by hydraulic cylinders, one for each rail. To have the same amount of pressure on all tools, these two slides are connected through rack and pinion, equalizing their traverse so that, if one cylinder does not properly function, the other cylinder will operate both rails to its capacity.

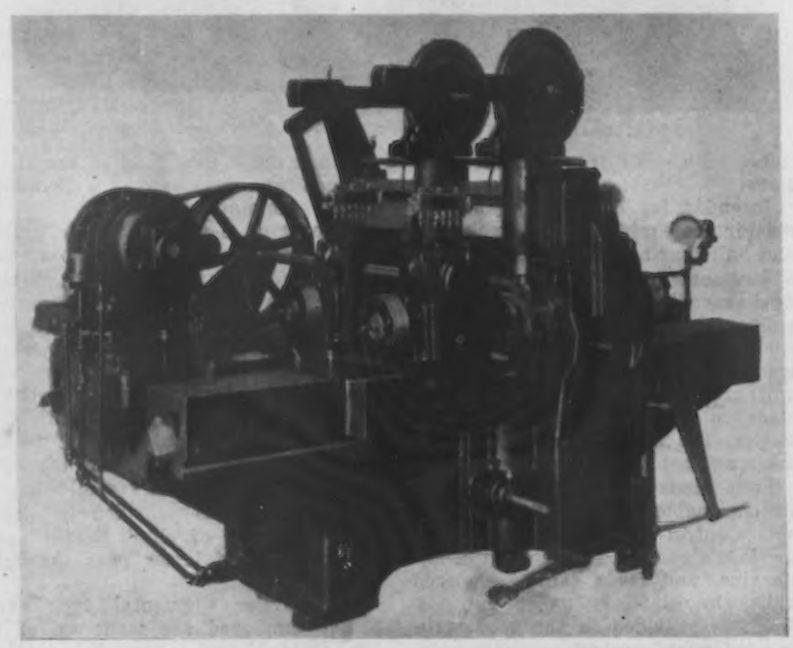
All fast-running shafts and spindles are ball-bearing mounted, and the spindles are provided with end adjustment for setting tools properly in relation to one another.

Machine is equippel with three motors: one on each rail, each driving two spindles, and the third motor mounted at the bottom of machine, to operate the Oilgear feed pump. The main drive in each case is through Texrope belts and spiral gears to the spindles.

In the center of machine is a holding fixture, consisting of an adjustable bar carrying V-block guides and stop, insuring the proper setting of the work. The adjustment for various sizes of radiator loops is made by gear and screw through the squared shaft shown directly above the foot lever at the front of the machine. Above this holding fixture are two V clamps, which clamp the loops securely in the fixture.

The cycle of operation: With spindles running, operator inserts casting into the fixture, then steps on foot pedal, releasing the clamps, which are brought into position through weights, after which the spindles feed in to the proper depth, perform the boring operation and run up against positive stops for the facing.

When sufficient pressure is built up, the flow of oil is automatically reversed, bringing the tools back to



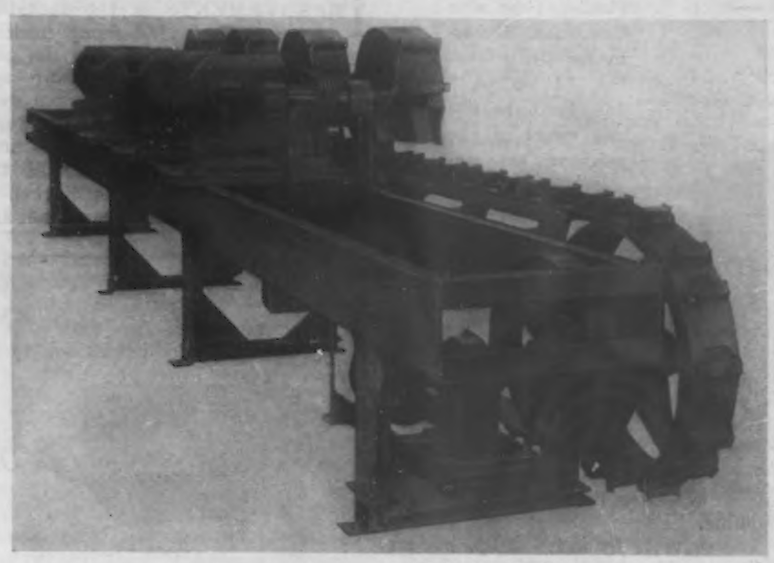
A Radiator Loop in the Machine, Held by the V-Clamps, Appears Near the Center of the Illustration. The four spindles are driven from two electric motors; their feeds by Oilgear equipment actuated by a third motor

the starting position. As soon as the tools clear the work, sufficient oil is released from the pressure circuit to raise the clamps to the release position, completing the cycle. When the operator removes one finished casting and inserts one to be finished the operation is repeated.

Production obtainable by this method is 225 loops an hour.

Continuous Type Grinder, Buffer and Polisher

FOR automatically grinding, buffing and polishing bumper rails, running board strips, hardware and a variety of other pieces, the Kent-Owens Machine Co., Toledo, Ohio, is marketing an improved continuous rail type machine arranged to permit the use of any number of heads.



Grinding, Buffing and Polishing Are Performed Automatically. Any number of wheelheads, driven by individual motor, may be used

Individual motors drive the spindles through V-belts, the spindles being mounted on ball bearings in dust-proof housings. Pressure of the wheels on the work is adjustable from 0 to 200 lb. and over, while the machine is in operation, by means of hand levers at the front. The wheels may be set at any angle up to 10 deg. to the right or left of the line of work travel. By staggering the wheels the motions of a hand operator at a buffing stand may be simulated and quality of finish improved. On machines of two or more heads half of the spindles may be operated at proper speed for new wheels and the other half at speeds for worn wheels.

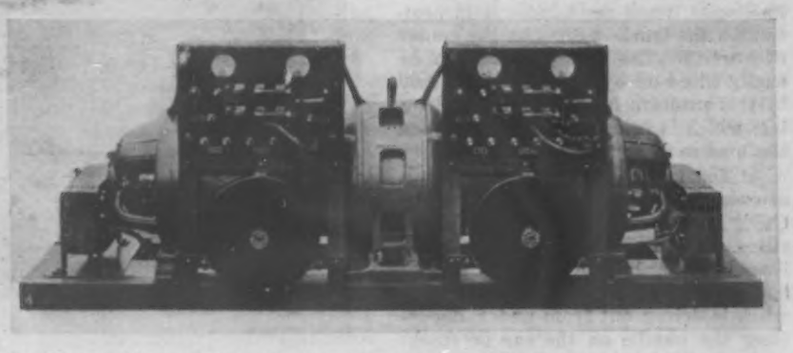
The work-carrying belt is steel faced and rides upon roller-bearing supports beneath the wheel contact area. Belt stretch is minimized by this feature and a large flat area is provided upon which a wide variety of work can be placed.

Some of the specifications are: Width of conveyor belt, 7 or 10 in.; speed of conveyor belt, 17 to 45 ft. per min.; maximum diameter of wheels, 16 in.

Generator for Two Welding Arcs

A UNIQUE combination of motors and generators for multiple welding has been devised by Electric Arc Cutting & Welding Co., Newark, N. J. In outward appearance it is two generators (each with its own control panel and resistors) with a direct connected motor between. The current from the armature of the right hand generator goes through the series field of the left hand generator, and the current from the armature of the left hand generator through the series field of the right hand generator.

Such cross connections are found to prevent one of the generators assuming the greater part of the load. It also allows the generators to be put in series, and produce high voltages for cutting, for carbon arc welding and for bronze welding of heavy sections.



An Electric Motor Drives the Two Generators. Independent control and adjustment are advantages claimed

Portable Hand Saw for Wood or Metal

THE portable electric hand saw illustrated is being manufactured by the Black & Decker Mfg. Co., Towson, Md., in three sizes for use of 6, 8, and 10 in. saws. Lumber up to 3½ in. thick can be cross cut and ripped and with a special saw blade the machine may be used for cutting light gage metal. Equipped with an abrasive disk, slate, marble and similar materials may be cut.

The saw blade is inclosed within a guard that telescopes automatically as the saw progresses into the work and snaps back when the cut is finished, entirely covering the saw blade. An adjustable shoe can be set to cut at any depth for cutting rabbets, etc. The shoe is also adjustable for cutting at any angle up to 45 deg. for mitering or for the jointing of long edges, and is notched to facilitate following a pencil line on the work.

Light weight is a feature, as well as the pistol grip and trigger switch intended to facilitate handling and controlling. The saws are driven by a universal motor and are air cooled.

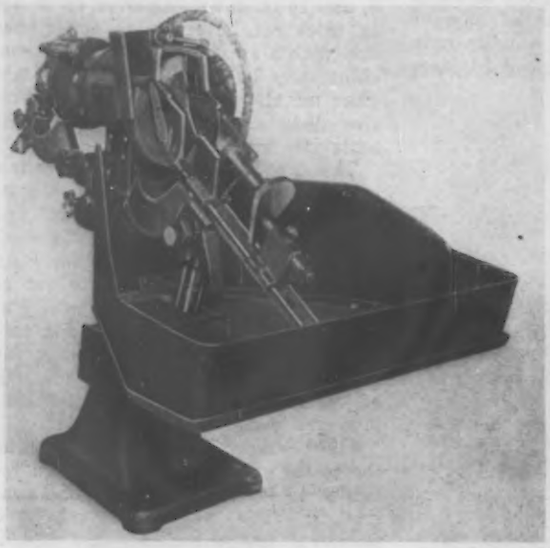
Saw Blades Are Furnished for Cutting Light Gage Metal, Slate and Other Materials

Ball bearings and chrome-nickel steel gears and shafts are used throughout. Gears run in grease-tight compartment.

The Welker Machinery Co., Inc., 2720 Union Trust Building, Detroit, has been appointed exclusive agent in Michigan for the Ferracute Machine Co., Bridgeton, N. J., manufacturer of presses. C. W. Ribble, former press engineer for the Ferracute company, has joined the Welker company as sales engineer.

Large Twist Drill Grinder

WITH maximum capacity for 5-in. diameter drills, the twist drill grinder illustrated is believed to be the largest machine for sharpening twist drills on the market. It is of double-holder type, permitting a combined capacity for drills from No. 52 straight shank drill to a taper shank drill, and from grinding a two-lip drill to a four-lip drill without any preliminary adjustments. The smallest drills are ground dry on a fine-grain wheel on one side of the machine, and the large drills are ground wet on a



(At Left) Drill Grinder of Double-Holder Type with Combined Capacity for Drills from No. 52 up to 5 In. Both the size and range of the machine are unusual

up to 5 in., which range is also a feature of the machine. The machine is built by the Gallmeyer & Livingston Co., Grand Rapids, Mich.

Both holders are of non-calipering type, on which it is possible to change from sharpening one size drill to another without spending time for preliminary adjustments. It is also possible to change from grinding a coarser wheel on the other side of the machine.

The drive is by a 1 1/2 hp. motor built into the head of the machine. Equipment includes grinding wheels, wheel-guards, pump, tank, pan and splash guards for large holder side of machine, and patented wheel truing mechanism with diamond for each wheel.

Self-Loading Trucks Handle Steel Sheets

FOR loading sheet steel, in bundles up to 10 tons, in and out of box cars and for unloading the bundles at destination the Atlas Car & Mfg. Co., Cleveland, has brought out a storage-battery truck with a tilting platform, on which the bundle of sheets is pulled by means of a looped cable attached to a motor-driven drum at the front end of the truck.

At the lower end the platform tapers down to the thickness of steel plate. This end rests on the floor when the platform is tilted down for loading. When the bundle is in position on the truck it rests on the center of gravity. The platform thus can be easily tilted up by hand, and it is held in this position by a locking mechanism which is released by a lever when the load is to be removed.

At the upper part of the platform are about 20 gravity rollers. When the truck is to be unloaded the table is tilted downward and the cable released. The bundle then is shoved back over the gravity rollers and the truck is driven out from under, depositing the bundle on the car or stock-room floor.

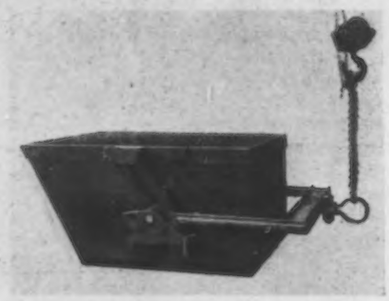
The truck is fully articulated, with the load equally distributed over its 10 wheels. It is driven by the pair of large wheels through spur gears. The separate hoisting motor is provided with a solenoid brake. Interlocking with the control mechanism is provided. The truck is compact, with a short turning radius, to permit its operation in and out of box cars. Its large battery permits it to be used for long work periods without recharging.

It is claimed that with this truck sheets can be handled at an average cost of 2c. a ton, and in some cases as low as 1c. a ton.

To Pick Up Its Load the Pointed Nose Is Lowered to the Ground and the Bundle Hauled Over It

Dump Bucket Saves Labor in Emptying

IMPROVEMENTS in the operation of manually-loaded dump buckets are incorporated in the Forsythe patented bucket, the manufacture and sales of which have been taken over by Edgar E. Brosius, Inc., Sharpsburg, Pa. The bucket eliminates the need of having a man stationed at the dumping location, as the bucket is handled entirely by the craneman, and



Electrically Welded Bucket Which Can Be Dumped Without Need for a Man on Ground (At Right)

it is not necessary for him to see it when dumping or hooking up.

It can be dumped from any uneven surface or slope and cannot be unlatched in midair. The unit is well adapted to the handling of building materials, as the load slides out of the bucket without impact.

The scoop is electrically welded throughout, the sides, bottom and ends being made of steel plate, reinforced around the top with heavy bar stock. The corners are reinforced with angles. The trunnions and tipper element are steel castings riveted to the scoop.

Steel Trade Again Urges Tariff Changes

John A. Topping, as Vice-President of American Iron and Steel Institute, and Thomas J. Doherty, Tariff Counsel, File Briefs with Senate Committee

WASHINGTON, June 25.—Appearing before subcommittee No. 1 of the Committee on Finance of the United States Senate, which is considering the metal schedule of the revised tariff bill, John A. Topping, vice-president of the American Iron and Steel Institute and chairman of the Republic Iron & Steel Co., said that "the impression that the steel industry is indifferent to tariff changes" is not true. He stated that the steel industry is very much interested in the maintenance of sound protective principles, not only for its own protection, but for the protection of all other domestic industries.

In appealing for certain recommended changes, which were stated in detail in a supplemental brief filed by Thomas J. Doherty, tariff counsel for the institute, Mr. Topping said that the recommendations were made by him as the general representative of the iron and steel industry and that "they are all made in the interest of maintaining high wages and full employment, without which we cannot maintain the maximum purchasing power of our people, which is the basis of our present prosperity."

Urges Reasonable Protection

"If we are to meet European competition on finished iron and steel products," Mr. Topping added, "we should reduce the cost on such of our raw materials and supplies as are not produced at home and maintain reasonable protection on finished products, in order to maintain our present wage schedules."

He suggested the removal of the duty on manganese ore, but the retention of a duty of $12.50 a ton on ferromanganese, in place of the 25 per cent ad valorem in the present act. His brief was in part as follows:

"Since the enactment of the Payne-Aldrich Law in 1909, the general trend of iron and steel costs has been strongly upward, by reason of increases in labor costs, freight rates and taxes. This, notwithstanding the great improvements made in the process of manufacture, through the introduction of labor-saving devices and general improvement in practice, which have resulted in speeding up output, reducing waste and saving man power.

"I may also state, since the date mentioned, base labor rates have increased about 115 per cent, and the hours of work reduced about 33⅓ per cent. That is to say, the rate per hour for common labor in 1909 was 15½c. for a 12-hr. day. At the present time, the rate per hour is 50c. for an 8-hr. day. In other words, common labor in 1909 earned $1.86 for 12 hours work, as against $4 per day for eight hours work at the present time. Freight rates and taxes have more than doubled and I need not point out that both of these items are determined by Governmental action and therefore, beyond our control.

"As to freight rates, when it is considered that it requires the movement of about six tons of raw material to produce one ton of finished product, it is obvious this large increase in freight rates has added enormously to cost of production. As against this large increase in cost of production, prices for iron and steel to the consumer have increased only about 44 per cent, as calculated by THE IRON AGE in their published showing of composite steel prices, for the period mentioned.

"While further progress may be expected in the future, through additional improvement in practice, it would be unreasonable to expect the same rate of progress as heretofore. However, it may be expected, as heretofore, that whatever cost economies are effected, will inure to the benefit of labor and the public.

"In view of the large increase in cost production, it will be apparent to this committee, that the rates of duty heretofore recommended are modest in the extreme, as the rates proposed on finished iron and steel are, in most every case, substantially lower than those in the Payne-Aldrich Law, whereas on most all imported raw materials or supplies, particularly in the case of manganese ore, they are excessively higher.

Manganese Ore Tariff Burdensome

"On manganese ore particularly, we feel that the duty imposed by the Tariff Act of 1922 is enormously burdensome and entirely without justification from any possible point of view. Manganese ore is literally a raw material, yet it bears a duty equivalent to an average ad valorem for the six calendar years, 1923 to 1928, of 81.58 per cent. In 1923 the duty was equal to 107.92 per cent and in 1928 to 88.76 per cent, and, as I view the situation, this duty is not in effect a protective one because, as has already been demonstrated, there is no domestic industry which produces or can produce the required amount of ore in commercial quantities. Since it is not a protective duty, it must be a revenue duty, and a revenue duty of approximately 100 per cent on a raw material is indefensible.

"As showing the unscientific character of this duty, I desire to draw your attention to the fact that the Government figures show the total duty paid on manganese during the six years (1923-1928) was more than 15 times the total value of the domestic production of metallurgical grade manganese ore, during the same period. I estimate that our total import tax on all imported raw materials, since the enactment of the Fordney bill, has been increased more than $24,000,000 per annum.

"As the manufacture of ferromanganese is an established domestic industry, we indorse the recommendation heretofore made, that a proper differential duty of $12.50 per ton be placed thereon, which is almost exactly the equivalent of 25 per cent ad valorem, the rate imposed by the existing law on alloys, not specially provided for, used in the manufacture of steel.

"I submit a statement of comparative imports and approximate ad valorem equivalent rates of duty on various alloys and supplies, as compared with the present approximate equivalent rates on various iron and steel finished products, which comparison will emphasize the claim, that these raw material import duties are all out of line with the protection accorded finished products.

Rates Need Adjustment

"To illustrate, for the year 1928, the ad valorem equivalent rate on ferrosilicon was 32.39 per cent; manganese ore, 88 per cent; and on the three principal tonnage items of finished steel, viz., steel bars 24½ per cent, sheets and plates 23.4 per cent, structural material (angles, beams and channels), 16 per cent. It is therefore plain that there should be an adjustment of these rates.

"In other words, we should either reduce the import rate on such of our supplies as are not produced in sufficient amount to meet domestic requirements, or advance the rates on finished products which are out of line with the raw material rates of duty.

"I also desire to indorse the recommendations submitted to the Ways and Means Committee of the House of Representatives, by my associate, Thomas J. Doherty, tariff counsel of the American Iron and Steel Institute, which recommendations are strictly in accord with the principle

of tariff adjustment and protective principles. These recommendations are suggested by the changes in economic conditions, since the date of the last tariff enactment. The purpose of the changes in the phraseology recommended is to remove the temptation to further litigation, as well as to clarify and simplify the administrative features of the bill."

Changes Suggested for Clarification

The brief filed by Mr. Doherty took up in detail the various changes recommended and the reasons therefor. The changes recommended are mostly in phraseology. It was stated that the changes are desirable for the following general reasons:

> Decisions of Customs tribunals whereby the evident intent of the lawmakers of the Sixty-seventh Congress was frustrated.
>
> The introduction into commerce of commodities that either did not exist or were of no commercial importance when the Tariff Act of 1922 was enacted.
>
> For the purpose of removing the temptation to further litigation by imposing the same, or approximately the same, rates of duty upon the same or approximately the same classes of products notwithstanding that they are known by different names.

The specific recommendations in the brief are given as follows:

Paragraph 302—Alloys Used in the Manufacture of Steel

H. R. 2667 contains a new subdivision of this paragraph, which reads as follows:

(j) Silicon aluminum, aluminum silicon, alsimin, ferrosilicon aluminum, and ferroaluminum silicon, 5 cents per pound.

The steel industry is particularly interested in the last three items, which are three names for the same article. It is an alloy made directly from bauxite ore in the electric furnace without reaching the stage of aluminum metal. It had been held by the Treasury Department in 1924, and again in 1926, to be properly classifiable under the provision in paragraph 302 for all alloys used in the manufacture of steel not specially provided for, but in September, 1927, the Treasury Department directed a change in practice and instructed collectors to assess the material for duty at 5c. per lb. under paragraph 374 as an alloy of aluminum. A protest against this assessment was sustained by the United States Customs Court, but upon appeal this decision was reversed by the United States Court of Customs Appeals and the material was held subject to duty as an aluminum alloy at 5c. per lb.

This is a raw product not capable of being worked or machined and fit for no other purpose than to be thrown into a steel bath to deoxidize the steel. It has nothing in common with the aluminum alloys of paragraph 374 and it does not and can not compete with them in any way. It is literally an alloy used in the manufacture of steel and there is no reason apparently why it should pay any higher rate of duty than that imposed in subdivisions l, m, n, and o, namely, 25 per centum ad valorem.

Duty of 5c. per lb. on this material is equivalent to 82½ per centum ad valorem. It can not bear such a duty and the importation has ceased.

It is recommended that subdivision (j) of paragraph 302 be stricken out and that the words "ferrosilicon-aluminum alloy used in the manufacture of steel and" be inserted in subdivision (o), so that the same shall read:

(o) Ferrosilicon-aluminum alloy used in the manufacture of steel and all alloys used in the manufacture of steel or iron, not specially provided for, 25 per centum ad valorem.

Paragraph 303—Iron

Recommendations were made to the House Ways and Means Committee to merge the first three brackets of this paragraph so that as amended the bracket will read "all the foregoing valued at not above 2½c. per lb."

It is not believed that this will raise the duty on any substantial quantity of iron that is honestly invoiced. This is what domestic manufacturers contend and it is confirmed by the following statement found in a brief filed by an importing corporation printed in volume 17 of the Hearings, Ways and Means Committee, page 10484. This corporation, referring to the recommendation made by the American Iron and Steel Institute, said:

"Their proposal to merge the two lower brackets in paragraphs 303 and 304 would, in my opinion, have little or no effect, from the standpoint of the Government, or domestic manufacturers or importers, as, to the best of my knowedge, no iron or steel can be brought into this country under the valuation as shown in these two lower brackets."

It would have the effect of preventing the dumping or undervaluation of iron.

Paragraph 304—Steel

This is the paragraph of the tariff law that deals with steel material and articles, rolled products for the most part. The first bracket of this paragraph provides for "all of the foregoing valued at not over 1c. per lb." It is urged in the first place that this bracket be stricken out in toto. There is no steel made that can be sold for this price. This statement is made by domestic manufacturers and it is confirmed by the following which appears in a brief filed by a corporation engaged in the importation of steel, printed in volume 17 of the Hearings, Ways and Means Committee, page 10484. This corporation, in referring to the recommendation made by the American Iron and Steel Institute for the merging of the first two brackets of paragraph 304, said:

"Their proposal to merge the two lower brackets in paragraphs 303 and 304 would, in my opinion, have little or no effect, from the standpoint of the Government, or domestic manufacturers or importers, as, to the best of my knowledge, no iron or steel can be brought into this country under the valuation as shown in these two lower brackets."

The elimination of the first bracket would have this effect. It would prevent the dumping or undervaluation of steel at an invoice value of 1c. per lb. or under. It is recommended, therefore, that the first bracket of paragraph 304 be eliminated and the second bracket be changed to read "all the foregoing valued not above 1½c. per lb."

H. R. 2667 inserts in this paragraph a new provision for concrete reinforcement bars. A recommendation to this effect was made by the American Iron and Steel Institute because of a decision of the United States Court of Customs Appeals, which held that concrete reinforcement bars, although admittedly bars and made in a bar mill, were entitled to entry as structural shapes of steel at a duty of ⅛ of 1c. per lb.

Paragraph 307—Boiler or Other Plate Iron or Steel

This paragraph provides three rates of duty according to whether the plate iron or steel is valued at 1c. per lb. or less, or above 1c. and not above 3c., or over 3c. per lb. For precisely the same reasons given in paragraphs 303 and 304 supra, we urge that the first bracket of this paragraph be stricken out, leaving only the two classifications, namely, plate iron or steel valued at not over 3c. per lb., and plate iron or steel valued at over 3c. per lb.

Paragraph 312—Structural Steel Shapes

Owing to the vague and indefinite terms used in this paragraph there has been a great deal of litigation thereunder. In the first place the term "structures" is not confined to buildings or ships, and steel forms or shapes entering into the construction of a brewery mash filter were held to be structural shapes as were steel shapes designed for use in the frames of automobiles. Kuyper v. United States 5 Court Customs Appeals 175, and Simon v. United States 8 Court Customs Appeals 273. Furthermore, the rate of duty carried by this paragraph being so excessively low there has been a strong incentive on the part of importers to secure entry for their products hereunder, and many articles have been claimed and some held to fall within the meaning of the term "structural shapes."

Our suggestion is that the terms "all other structural shapes of iron or steel" be stricken out altogether, leaving the paragraph to operate only on articles mentioned by name, to which may be added such other designations as may seem wise.

An alternative suggestion, and a preferable one, is to let the language stand and change the rates of duty for those that are not assembled, manufactured or advanced, etc., to ⅛ of 1c. per lb., and on those manufactured or advanced, to 1c. per lb. These rates are consistent with the rates named in paragraph 304.

As further showing the looseness of phraseology used in this paragraph, attention is invited to the fact that the term "building forms" is used twice in this paragraph at three different rates of duty. Building forms not manufactured or advanced are dutiable under the present law at ⅛ of 1c. per lb., and those that are manufactured or advanced at 20 per centum ad valorem. Besides these two enumerations, the last bracket in the paragraph provides for building forms, without any qualification of restriction, at 25 per centum ad valorem.

Yet, nobody seems to know what building forms are. In Soule v. United States 16 Court Customs Appeals 524 the importer tried to utilize the term "building forms" to cover the product there in suit. The court said:

"Just why the words 'and building forms' appear twice in the paragraph, we are not called upon to decide* * *. Adverting to the third contention of the importer, there is no testimony as to what constitutes a building form, the briefs of counsel on both sides are silent as to this question and we have found no applicable authority to which we may refer."

It would seem that a term should not be used in the law when nobody knows what it means.

Paragraph 312—Steel Sheet Piling

H. R. 2667 inserts a new enumeration for sheet piling at a duty of ⅛ of 1c. per lb. It is well to make provision for sheet

piling as this is an article of considerable importance and is imported in substantial quantities. It is a highly developed rolled product and the duty the House has assigned to it, ⅛ of 1c. per lb., has no relationship whatever to its value and it is wholly out of line with the rates of duty on rolled steel products generally. In fact the duty assigned to it is the same as that imposed on steel valued at not over 1c. per lb., which, as already stated in paragraph 304 supra, does not exist.

The American Iron and Steel Institute suggested that concrete reinforcement bars and sheet piling, both of which were victims, so to speak, of adverse court decisions, be placed in paragraph 304 where they would take duty according to value along with the other steel bars, steel plates, and rolled steel products generally. The Ways and Means Committee accepted the suggestion as to concrete reinforcement bars, but took contrary action on sheet piling.

It should also be pointed out that the provision in H. R. 2667 for sheet piling is without any words of restriction or description, and therefore, even if it is further advanced or assembled, or has attachments added, it would still take this excessively low rate.

This article is extensively used in the construction of buildings, bridges, docks, jetties, sea walls, etc., and because of its peculiar cross section, which includes edges so rolled that each piece of piling interlocks with its neighbor thus forming a continuous wall, it is a highly developed product of the rolling mill.

Until the court decision holding it dutiable at ⅛ of 1c. per lb. was handed down in 1927, the imported piling had paid duty under paragraph 304, generally, at the rate of 5/10 of 1c. per lb. because of its value, and the importations were continuous and substantial in amount, although, as the figures are not segregated in the Government statistics, no official figures can be given. However, inquiry in the trade leads to the belief that production in this country in 1928 was about 65,000 tons. As to importations, we have the statement of George E. Dix, who is agent in New York for the German manufacturers of sheet piling, that in 1928 "we have brought in something over 15,000 tons of piling."

It is recommended that the separate provision for sheet piling be continued but that the duty thereon be made 5/10 of 1c. per lb., which is the rate that was intended by the Tariff Act of 1922 to be levied thereon. It is plain from this that such a duty would not stop foreign importations.

Paragraph 313—Hoop, Band and Scroll Iron or Steel

This paragraph provides for the commodities named above when valued at 3c. per lb. or less, but makes no specific provision for them when they are valued at over 3c. per lb. Apparently, the latter articles would fall in the basket provision, which in the present law and in H. R. 2667 carries the rate of 25 per cent.

In a case recently decided in the Customs Court (Abstract 8251, March 20, 1929), the merchandise consisted of flat steel in coils of indefinite lengths, and the Collector of Customs at Boston classified and assessed it for duty under the second subdivision of paragraph 313 at 35/100 of 1c. per lb. The importers protested and claimed the merchandise to be flat steel wire rods dutiable under paragraph 315 at only 3/10 of 1c. per lb. At the trial the witness for the importer said the merchandise was flat steel wire rods and the witness for the Government said it was hoop or band steel. The court decided in favor of the importer on the weight of the testimony. As the differential between the two rates is only 5/100 of 1c. per lb., it would seem wise to abolish it. Since the two products are so much alike, it does not seem as though there ought to be any difference in the duty. The same criticism of these two paragraphs appears in a letter from the Thompson Wire Co. of Boston, printed on page 1944, Hearings, Ways and Means Committee, vol. 3.

Paragraph 328—Tubes

This paragraph prescribes certain rates of duty on lapwelded, buttwelded, seamed, or jointed iron or steel tubes, pipes, flues, and stays, the rate varying with the diameter of the tube. The statute does not mention, however, whether the diameter is the outside or the inside diameter, and some difficulties of adminstration have arisen. We repeat the suggestion that was made to the House Ways and Means Committee that the statute prescribe the outside diameter, and necessarily this requires an adjustment of the rates of duty. The following schedule of duties is proposed:

Lapwelded, buttwelded, seamed, or jointed iron or steel tubes, pipes, flues, and stays, not thinner than 65/1000 of 1 in., if not less than 5/8 of 1 in. in outside diameter, 1c. per lb.; if less than 5/8 and not less than ½ in. in outside diameter, 1½c. per lb.; if less than ½ in. in outside diameter, 1¾c. per lb. Provided, that no tubes, pipes, flues, or stays made of charcoal iron shall pay a less rate of duty than 1¼c. per lb.

Cylindrical and tubular tanks or vessels, for holding gas, liquids, or other material, whether full or empty; welded cylindrical furnaces, tubes and flues made from plate metal, whether corrugated, ribbed, or otherwise reinforced against collapsing pressure, and all other finished or unfinished iron or steel tubes not specially provided for, 35 per cent.

Flexible metal tubing or hose, whether covered with wire or other material, including any appliances or attachments affixed thereto, not specially provided for, and rigid iron or steel tubes or pipes prepared and lined or coated in any manner suitable for use as conduits for electrical conductors, 35 per cent.

Paragraph 331—Nails and Spikes

The provision in the present law and in H. R. 2667 for wire nails does not conform to commercial practice, and it is suggested that the provisions for such nails and the rates of duty thereon be as follows:

Nails, spikes, tacks, brads, and staples, made of iron or steel wire not less than 1 in. in length and exceeding 148/1000 of 1 in. in diameter, 4/10 of 1c. per lb.

Not less than 1 in. in length, 72/1000 of 1 in. or more in diameter but not exceeding 148/1000 of 1 in., ¾ of 1c. per lb.

Less than 1 in. in length or less than 72/1000 of 1 in. in diameter, 1½c. per lb.

Copper Record of 1928

Last year was marked by the largest production of refined copper from domestic and foreign sources ever made in the United States, according to the United States Bureau of Mines. In the latter part of the year, mine production was greatly increased. The increase in production, however, was not sufficient to offset the increase in deliveries, and stocks of refined copper at the end of 1928 were lower than they had been since the end of 1917.

Blister stocks were larger than at the end of 1927, but total blister and refined stocks also were the lowest since 1917. Domestic withdrawals were indicated to be 1,608,538,878 lb., exceeded only by those of 1918 at 1,661,669,576 lb. Imports of unmanufactured copper in 1928 were the highest on record and exports of metallic copper were exceeded only by the exports of 1917, 1,125,647,336 lb.

Western Automatic Machine Screw Co., cold-drawn bar steel division, Elyria, Ohio, has appointed the Motor City Sales Co., 676 West Grand Boulevard, Detroit, as sales and service representatives in Michigan.

Principal Markets for American Construction Machinery and Equipment

Country of Destination	1925	1926	1927	1928
Canada	$1,266,248	$1,653,772	$2,152,048	$3,602,726
Soviet Russia	128,929	112,881	414,445	1,042,123
Cuba	158,158	323,285	987,080	733,577
Argentina	190,499	374,152	566,968	636,679
Mexico	609,886	760,249	1,120,321	612,003
Spain	164,863	50,123	226,650	607,104
British India	744,700	455,386	700,678	602,929
Colombia	142,774	349,498	553,378	562,572
Brazil	95,199	295,258	284,394	446,419
Chile	799,553	599,019	1,025,098	393,679
France	100,117	76,664	38,586	383,444
Australia	172,805	364,007	237,781	357,324
Uruguay	38,506	76,947	128,096	286,882
China	47,625	68,229	329,162	282,434
Panama	36,554	45,007	109,427	275,178
Peru	175,835	218,671	153,198	198,395
Japan	396,092	519,580	166,012	198,395
Germany	27,851	33,991	151,587	165,316
Union of South Africa	43,978	80,238	90,713	151,378
Italy	77,592	109,158	72,455	145,184
Belgium	25,267	11,404	8,687	141,015
United Kingdom	192,041	245,368	209,994	135,603
British West Africa	605	101,413	202,474	126,128
Venezuela	31,229	158,747	93,222	113,098
Dutch West Indies	50,831	6,807	107,221	112,079
Honduras	10,782	13,801	56,955	102,809
Total, including other countries	$6,724,981	$9,030,155	$11,458,049	$13,760,176

From report by L. J. Cochrane of the Industrial Machinery Division, Department of Commerce.

Mileage Freight Rates Ordered

Interstate Commerce Commission Decides on Revision Affecting Iron and Steel Products to Go Into Effect on or Before October 20

BY L. W. MOFFETT

WASHINGTON, June 25.—Marking the most sweeping railroad rate readjustment of the kind ever made, the Interstate Commerce Commission in a decision announced last Saturday prescribed a basic mileage scale, effective on or before Oct. 20, to apply to manufactured iron and steel products in carloads, minimum 40,000 lb., throughout Official Classification territory. The only broad deviation from the levels set up is that provided in a scale for New England, which is 10 per cent higher than the basic scale. Generally, the readjustment reduces long haul rates, although there are some increases, and this is especially true in connection with short hauls. The rates are prescribed as reasonable maximums.

Official Classification territory roughly consists of that section of the United States lying east of the Mississippi River and north of the Ohio and Potomac rivers and in it approximately 90 per cent of the country's steel is produced. The decision was made in connection with what is known as the general steel rate case and was the first major finding under the Hoch-Smith resolution. Under this resolution, rail rates on products of agriculture and basic commodities are being investigated for the purpose of seeing that the burden of the transportation charges is distributed equitably "as between the various localities and parts of the country."

Rates Higher Than J. & L. Scale

The rates prescribed in the steel case are somewhat higher than the so-called Jones & Laughlin mileage scale and those in the proposed report of the examiners. The scale exceeds by ½c. for each mileage block from 20 miles up to and including 300 miles that which had been recommended by the examiners. Based on the revenue test of 1925 made in the Eastern Class rate case, Commissioner Woodlock, in a part concurring view, estimated that the rates provided in the scale will "bring about a reduction of $2,500,000 and perhaps more" in the annual revenues of the carriers. With some other commissioners, he approved of the rate relationship named in the scale but thought the scale should have been higher. The suggested reduction in revenues of the carriers necessarily is speculative only. There are those who think the steel traffic readjustment under the new scale actually will mean an increase in revenues for the railroads.

The opinion in the case, written by Commissioner Campbell, does away with all important differential adjustments, except in the case of New England, and wipes out such long-standing differentials as Michigan zone arbitraries and those applying to Johnstown, Pa., and Cumberland, Md. Final disposition of the rate structure in the southern part of Official Classification territory in West Virginia and Virginia south of the main line of the Baltimore & Ohio Railroad was left for decision in the Eastern Class rate case. Differentials for lighterage and other costs in and around New York harbor were also provided. All rates are to be computed on the basis of the shortest routes over which traffic can be moved without transfer or lading.

Fifth Class Basis Condemned

The report definitely condemned the fifth class basis for general application on iron and steel articles. Recognition was given to testimony that, unless comparatively short-haul rates were held down, competition of the barges on the Ohio River particularly and of motor trucks would take a considerable tonnage from the railroads. Nevertheless, rates for some short hauls will be raised sharply, if the mileage scale is applied, as is shown in the accompanying tables, and while they emphasize the situation as to points from Pittsburgh they are manifestly symbolic, and the same situation applies throughout the affected territory. This is done through the basic scale, which provides a rate of 6c. per 100 lb. for hauls five miles and under up to the maximum rate of 56c. for hauls 1200 miles and over 1165. Among the groups which the commission particularly pointed to as being too wide was the Philadelphia group. Under the scale the Philadelphia-New York rate will be reduced by 2.5c. to 15c. from 17.5c. per 100 lb., while the Bethlehem-New York rate remains at 14.5c. The so-called 100 per cent New York-Chicago basic

Effect of Interstate Commerce Commission Decision on Steel Rate Structure in Official Classification Territory

(*In Cents per 100 Lb.*)

From:	New Rates Effective Oct. 20	Present Rates	Change —Decrease +Increase
Pittsb'gh to			
New York	33	34	—1
Chicago	34	34	None
Philadelphia	29	32	—3
Baltimore	27	31	—4
Buffalo	23.5	26.5	—3
Detroit	26.5	29	—2.5
St. Louis	39	40½	—1½
Boston	40	36.5	+3.5
Carnegie, Pa.	6.5	2.9	+3.6
Verona, Pa.	6.5	6	+ .5
Ambridge, Pa.	8	3.5	+4.5
Johnst'n, Pa.	14	11	+3
Wheeling, W. Va.	12.5	11	+1.5
Warren, Pa.	20	18.5	+1.5
From: Chicago to			
Detroit	25	27.5	—2.5
St. Louis	26	22	+4
New York	47	56.5	—9.5

From:	New Rate	Present Rate	Change
Youngstown to			
Detroit	23.5	26.5	—3
Claypool, Ind.	26.5	25	+1.5
Fort Wayne, Ind.	24.5	23	+1.5
From:			
Philadelphia to			
Youngstown	32	36	—4
Chicago	46	54.5	—8.5
Cleveland	35	38	—3
Detroit	41	42	—1
Boston	28	25.5	+2.5
New York	15	17.5	—2.5
From:			
Bethlehem, Pa., to			
Allentown, Pa.	6	3	+3
Phillipsburg, N. J.	7	8	—1
Philadelphia	11.5	13	—1.5
Reading, Pa.	10	13	—3
New York	14.5	14.5	None
Williamsport, Pa.	19	19	None
Rochester, N. Y.	26.5	22.5	+4
Coatesville, Pa.	14	17.5	—3.5

rate of 56.5c. will be sharply reduced to 47c., a cut of 9.5c. The Pittsburgh-New York rate will be decreased 1½c. to 33c., while the Pittsburgh-Chicago rate will remain at 34c., which is the same as the fifth class rate between these points, but the Pittsburgh-St. Louis rate will be lowered 1½c. to 39c., while the Chicago-St. Louis rate will be increased 4c. to 26c. The result will be that the present spread of 19c. in the Chicago rate to St. Louis under the Pittsburgh rate will be narrowed to 13c. The Pittsburgh-Detroit rate will be reduced 2.5c. to 26.5c., while a similar reduction will be made in the Chicago-Detroit rate, which will be 25c.

Shippers Concerned in Rate Relationships

Passing upon the rate relationship of steel rates in the territory, the decision said, in part:

"While the record contains a considerable amount of evidence intended to prove that the general level of steel rates is too high, it indicates clearly that the level of the rates is of much less importance to shippers generally than is their relationship. The production of steel is widely distributed throughout Official Classification territory and competition is keen. It has been particularly keen since 1920, due partly to a period of overproduction following the war. Mills in each of the three great producing districts (Eastern, Central and Western) compete with other mills in the same district and with those in other districts. The capacity of each district exceeds the requirements of its nearby territory and each seeks to extend its markets in the direction of the others. Producers in the Western district do not get into trunk line or New England territories to any great extent and producers in the Eastern district do not ship heavily to Central territory. The middle district, with a capacity exceeding that of the other two combined, competes keenly with the Western district in Central territory and with the Eastern district in trunk line and New England territories."

The result of abolition of the so-called Pittsburgh-plus basing system, the opinion said, has been to restore to freight rates their influence upon the marketing of steel and to emphasize the importance of having such rates properly adjusted as between competing points of production.

Rate Revision Declared Desirable

It was declared that the record left no doubt as to the need and the desirability of a thorough revision of the steel rate structure. Aside from the question of whether the present rates considered as a whole are upon the proper level, it was stated, there is disclosed an utter lack of consistency and orderly arrangement, accompanied by many instances of unlawful prejudice and preference which should be removed. Establishment of a mileage scale was held to be necessary, but objection was made to proposals of both carriers and shippers, which offered varying scales. Scales proposed by the carriers, it was said, would result generally in increasing the present level, while those of the shippers for the most part were said to have contemplated reductions, many of which, the opinion stated, would make heavy inroads into the carriers' revenues from the steel traffic. A comparison of rates on steel with rates on other commodities which move at fifth-class rates or less, the large and constant volume in which it moves, its heavy loading, the very small risk in connection with its transportation, and its small value per weight unit, were all held to be persuasive that the general level of rates should be lower than the present fifth-class. This was declared to be especially true of hauls up to 200 miles.

The action of the commission in raising the carload minimum from 36,000 lb. to 40,000 lb. was based on the contention that evidence showed the higher minimum would be reasonable, although it was said that testimony indicated the establishment of a minimum much in excess of 36,000 lb. would seriously affect the business of the jobber and small fabricator.

Dealing with the question of grouping, the decision said that there was a great variety of opinion on the subject of origin and destination groups, ranging from the advocacy of a point-to-point basis to a defense of most of the present groups. Origin groups were favored generally by both shippers and carriers. The commission said, however, that groups of excessive size, especially when the minimum hauls are so disproportionate to the maximum hauls as to impose unreasonable rates for the shorter distances, cannot be sanctioned. Among groups specificially mentioned as being entirely reasonable are those of the Valleys and Buffalo. On the other hand, it was declared to be clear that the Philadelphia group is too wide for the length of haul involved. The Philadelphia group, as it now exists, includes points ranging from 88 to 117 miles distant from New York and the commission said no grouping is justifiable in connection with hauls for such distances, except such as naturally accompanies the application of the scale. The Pittsburgh group also was subjected to criticism on account of its size, although, it was pointed out, this group does not apply in connection with as short hauls as do the large Eastern groups.

Will Split Up "Pittsburgh Group"

"It is difficult to determine from this record just how the Pittsburgh group should be divided," the decision said. "There does not appear to be any good reason for including such points as Erie, Pa., and Jamestown, N. Y. The points in Ohio and West

*Basic Scale of Reasonable Maximum Rates Prescribed

(*In Cents per 100 Lb.*)

	Cents		Cents
5 miles and under	6	270 miles and over 260	25
10 miles and over 5	6.5	280 miles and over 270	25.5
15 miles and over 10	7	290 miles and over 280	26
20 miles and over 15	8	300 miles and over 290	26.5
25 miles and over 20	8.5	320 miles and over 300	27
30 miles and over 25	9	340 miles and over 320	28
35 miles and over 30	9.5	360 miles and over 340	29
40 miles and over 35	10	380 miles and over 360	30
45 miles and over 40	10.5	400 miles and over 380	31
50 miles and over 45	11	425 miles and over 400	32
55 miles and over 50	11.5	450 miles and over 425	33
60 miles and over 55	12	475 miles and over 450	34
65 miles and over 60	12.5	500 miles and over 475	35
70 miles and over 65	13	535 miles and over 500	36
75 miles and over 70	13.5	565 miles and over 535	37
80 miles and over 75	14	600 miles and over 565	38
85 miles and over 80	14.5	635 miles and over 600	39
90 miles and over 85	15	665 miles and over 635	40
95 miles and over 90	15.5	700 miles and over 665	41
100 miles and over 95	16	735 miles and over 700	42
105 miles and over 100	16.5	765 miles and over 735	43
110 miles and over 105	17	800 miles and over 765	44
120 miles and over 110	17.5	835 miles and over 800	45
130 miles and over 120	18	865 miles and over 835	46
140 miles and over 130	18.5	900 miles and over 865	47
150 miles and over 140	19	935 miles and over 900	48
160 miles and over 150	19.5	965 miles and over 935	49
170 miles and over 160	20	1,000 miles and over 965	50
180 miles and over 170	20.5	1,035 miles and over 1,000	51
190 miles and over 180	21	1,065 miles and over 1,035	52
200 miles and over 190	21.5	1,100 miles and over 1,065	53
210 miles and over 200	22	1,135 miles and over 1,100	54
220 miles and over 210	22.5	1,165 miles and over 1,135	55
230 miles and over 220	23	1,200 miles and over 1,165	56
240 miles and over 230	23.5		
250 miles and over 240	24		
260 miles and over 250	24.5		

*Rates within New England 10 per cent higher.

Virginia now included in the group should constitute a separate group."

In passing upon the three Michigan zones, A, B and C in which arbitraries have been applied and which were attacked by Michigan interests, the commission said that it does not appear that traffic and transportation conditions within zone B are sufficiently different from zone A and the remainder of Official territory to require the addition of arbitraries for application within zone B. Furthermore, because of the comparative unimportance of the matter from a revenue standpoint, due to the fact that little or no iron and steel tonnage moves to and from zone C, the commission said it did not feel warranted in prescribing any arbitraries for zone C application.

Dealing with differentials, the commission said that their use both at interior points and at the ports is not in harmony with the theory upon which the rate structure proposed is based and that their use in connection with it is disapproved. It was pointed out that the differential adjustment which formerly existed at such points as Cleveland, Canton, Massillon and Youngstown has generally disappeared. The differential relationship of Johnstown and Cumberland to Pittsburgh has been largely abolished, the opinion said, on west-bound traffic "where it worked to the advantage of those points, but has been retained on east-bound traffic where it gives them higher rates than they would have on a strictly distance basis."

It was said that while many producers concerned desired the restoration of the differential adjustment, Cleveland interests opposed it. It was also strongly opposed by certain producers in the Pittsburgh district. Both central and trunk line carriers advocated the retention eastbound and the restoration westbound of the Johnstown and Cumberland differentials. They conceded, it was stated, that if Wheeling were continued in the Pittsburgh group there would be justice in the request of Youngstown interests for a differential relationship with Pittsburgh. Trunk line carriers asked for the retention of the present differential relationship between the ports of New York, Boston, Philadelphia and Baltimore. This was also advocated by some shippers, principally on the ground that they have been in effect for many years and are an essential part of a long-established basis of competition which should not be disturbed.

Export rates were originally included in the investigation, these rates having been generally 75 per cent under domestic rates. However, subsequently the carriers filed schedules proposing to reduce the export rates to the basis of approximately 60 per cent of the domestic rates, and to increase the minimum weight from 36,000 lb. to 45,000 lb. The schedules became effective Dec. 31, 1927, and have been extended to Dec. 31, 1929. In view of these facts, the commission said, export rates were not further considered in the general rate case.

Cast iron pipe was included in the decision, but the commission stated that this was not to be taken as setting aside the finding of undue prejudice in the Krupp Foundry Co. case. The commission as a whole has denied the petitions of Southern cast iron pipe makers and southern carriers for reopening of and further hearing in the case, but Division 3, which passed upon this case, has reopened it for further consideration.

Passing upon intrastate rates, covering those in Ohio in a Sec. 13 (discriminatory) proceeding, Docket 17878, which was consolidated with the general investigation, the commission said that, by reason of the general readjustment prescribed, the Ohio rates had become moot. It was added, however, that it is obvious that a general revision of the rate structure along the broad lines laid down could accomplish its purpose only if the rates within the several States were at the same time subjected to such revision as might be necessary to bring them into full harmony with the interstate rates prescribed.

Durability of Structural Steel

Tacoma Building, 42 Years Old, Yielded Old Material in Good Enough Condition for Added Years of Service

PROOF that structural steel can successfully carry its designated loads and withstand deterioration through corrosion and other sources has been afforded by analysis of the material removed from the Tacoma Building, Chicago. This 13-story building was erected in 1887 by George A. Fuller Construction Co.

The framework was designed to make use of either rolled and fabricated shapes or cast iron for all supporting columns. The cast iron columns used to bear the perpendicular load had a circular cross section, providing efficient strength and rigidity. Some of the columns were cast with four rectangular ribs spaced 90 deg. apart. They were bolted together from end to end, and were cast with brackets to which the beams were bolted.

Few rivets were used in the construction; the automatic riveter had not then been invented. Such riveting as was done was by a hand hammer known as a "flogging-hammer." It had a long handle, which gave added impress to the swing of the riveter. Rivets were used only in places where steel was joined to steel, and bolts where the steel was joined to cast iron brackets. The rivet heads were all as neatly finished as any in a modern structure.

Only brick and tile were used to cover the steel framework. That was the total protection offered the structural members during the 42 years the building was standing. Henry Penn, district engineer of the American Institute of Steel Construction, located at Chicago, submitted samples of material to Robert W. Hunt Co., engineer, Chicago, for careful investigation. A report of the Hunt company gives results of analysis of one sample of metal frame:

Carbon	0.12	per cent
Manganese	0.40	per cent
Phosphorus	0.063	per cent
Sulphur	0.032	per cent

The analysis indicates this material to be steel and not wrought iron. The manganese content is especially significant. An etching test made on a portion of the metal frame further verified this conclusion.

There has been no evidence of deterioration in the crystalline structure, and it is believed that the framework of this building would have been efficient for many years to come. Original location markings in paint were fresh and bright. The material in the webs of the beams as originally rolled was less than ¼ in. thick, yet was still perfect and capable of carrying the loads, when the sections were removed.

Farm and Credit Situations Only Adverse Factors

"The end of the current wave of prosperity is not yet in sight," the Conference of Statisticians in Industry, operating under the auspices and with the cooperation of the National Industrial Conference Board, New York, concludes in its June report.

The month of May, according to the conference report, turned out to be much more cheerful as regards industrial and trade activities than had been seriously anticipated by most business commentators. The generally expected "more than seasonal decline" did not materialize; on the contrary, unfilled orders, backlogs, stocks on hand, together with the generally encouraging news from abroad, indicate conditions much better than anticipated.

Industrial and trade activity, indeed, seems "on the road toward establishing a new high second quarter record," according to the analysis of the conference. Employment and payrolls increased during May and for the first time since the Bureau of Labor Statistics has been reporting on employment it has been greater in May than in April.

"A very unstable agricultural situation," with the average price of farm products two and one-half points lower in May than in the preceding month, and the "anomalous credit situation" are pointed out by the conference as the two adverse factors.

Better Feeling in European Markets

British Pig Iron Output Still Inadequate—German Exports at Record Heights—Electrical Welding of Ships in Germany

(*By Cable*)

LONDON, ENGLAND, June 24.

CLEVELAND makers are unable to satisfy the sustained demand for pig iron, with coke still the main factor in hampering expansion of output. Many ovens have been idle so long they are now obsolete and the price of coking coal is so high that conversion into coke is not attractive. One Cleveland consumer has bought about 16,000 tons of Midlands pig iron and others have arranged for further contracts. Hematite iron is active, particularly for export, and although production is to be increased, makers have already anticipated it in sales.

Foreign steel is inactive here, with British consumers of semi-finished buying English material in districts where the margin of cost over foreign is only slight. Sheet mills are asking for suspension of deliveries of raw materials because of slackness in sheet demand.

Tin plate demand is quiet and makers have eased prices in the absence of substantial business. Mills are generally well sold for forward delivery but are accepting 18s. 3d. ($4.42) per base box, f.o.b. works port, for early shipment to fill up gaps in their schedules.

Galvanized sheet makers have abandoned their agreement for minimum price, but are retaining regulation of output. Demand is quiet and several mills are idle. Japanese demand for black sheets is negligible.

The Stanton Iron Works Co., Nottingham, has secured a contract for 50 miles of cast iron waterpipe for South America.

Continental makers report continued weakness in merchant bar prices, but a firm tone in semi-finished material, beams and plates.

The International Steel Cartel has increased its third quarter quota by 1,000,000 tons annually. The next meeting will be in Vienna, Sept. 22 to 28. The International Wire Rod Cartel has decided to make no change in prices in the near future. A members' meeting is scheduled for July 8, to discuss the German quota excess in the second quarter, caused by German mills making shipments delayed by the lockout in November, 1928. The International Rail Makers' Association has now definitely been signed for a period of six years. Rail prices are unchanged and important orders are said to have been delayed pending the recent meeting.

German pig iron output in May was 1,133,000 tons, with 102 furnaces in blast June 1.

British Steel Trade Better

Depression from Election Result Not Evident—Steel Mills Active on Small Products—Pig Iron Scarce

LONDON, ENGLAND, June 17.—Business in iron and steel has been to some extent influenced by the election but the overwhelming defeat of the protectionists has not brought about the depression expected in some quarters. As a matter of fact the steel industry as a whole has accepted the result very well, and many directly and indirectly connected with the steel industry are greatly relieved.

While the change in Government has not been received with open arms, it is believed that it may serve both to relieve the burden of unemployment and to remove the country from the rut into which many believe it has sunk during the past few years. Nothing drastic is likely to be attempted, although strong pressure may be brought to bear upon the Prime Minister by the extremists. Liberals hold the balance of power and probably could terminate the administration at will.

Both the new Government and the Liberals are strong anti-protectionists, so that safeguarding for iron and

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12½s.				$17.58			
East Coast Hematite..	3 14	to	£3 14½s.		17.94	to	$18.06	
Ferromanganese, export	14 0				67.90			
Billets, open hearth...	6 10	to	6 12		31.52	to	32.12	
Sheet bars, open hearth	6 10				31.52			
Black sheets, Japanese specifications	13 5				64.26			
Tin plate, per base box	0 18¼	to	0 18½		4.42	to	4.48	
Rails, 60-lb. and heavier	7 15	to	8 15		37.59	to	42.43	
					Cents per Lb.			
Steel bars, open hearth	7 15	to	8 7½		1.67	to	1.81	
Beams, open hearth...	7 2½	to	7 12½		1.55	to	1.65	
Channels, open hearth.	7 7½	to	7 17½		1.60	to	1.71	
Angles, open hearth...	8 2½	to	8 12½		1.76	to	1.86	
Ship plates, open hearth	7 12½	to	8 2½		1.66	to	1.76	
Black sheets, No. 24 gage	10 5	to	10 10		2.21	to	2.27	
Galvanized sheets, No. 24 gage	13 10	to	13 12½		2.92	to	2.94	

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 10s.	to	£3 14½s.		$16.97	to	$18.06	
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 12				17.45			
Billets, Thomas	5 3	to	5 8½		24.98	to	26.31	
Sheet bars, Thomas....	5 7½	to	5 8		26.07	to	26.19	
Wire rods Low C., No. 5 B.W.G.	6 5	to	6 6¼		30.31	to	30.61	
Black sheets, No. 31 gage, Japanese	12 10				60.62			
Rails, 60 lb. and heavier	6 10*				31.52			
Rails, light	6 1½				29.46			
					Cents per Lb.			
Steel bars, merchant...	5 17½	to	6 0		1.27	to	1.29	
Steel bars, deformed...	5 17	to	5 18		1.27	to	1.28	
Beams, Thomas, British standard	5 4	to	5 9		1.12	to	1.14	
Channels, Thomas, American sections...	6 1				1.31			
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5 9				1.14			
Angles, Thomas, 3-in...	6 0				1.30			
Ship plates, open-hearth, inspected	7 10				1.62			
Hoop and strip steel, over 6-in. base	6 7½				1.38			
Wire, plain, No. 8 gage	7 15				1.67			
Wire, galvanized, No. 8 gage	9 10½	to	9 12½		2.06	to	2.12	
Wire, barbed, 4-pt. No. 12 B.W.G.	12 0½				2.60			
Wire nails, base	8 0½				$1.74	per keg		
Wire nails, assortments, 1 to 6-in. keg	10 9				2.26			

*Open-hearth steel, 10s. ($2.42) per ton extra.

steel is not likely to be considered. The steel trade itself has been divided into two groups — manufacturers anxious to shut out all foreign finished and raw material and producers whose profits are obtained largely from exports of the finished article from the cheapest raw material.

The general situation is steadily improving. Pig iron producers in the Cleveland area are experiencing a strongly sustained demand, and, although they are gradually blowing in additional blast furnaces, they cannot fully satisfy it. Output has been sold out to October, and furnaces are not inclined to accept business for the rest of the year. As a result, merchants with any small lots of iron on hand are able to do good business, and prices are steadily advancing. The minimum fixed prices are no longer a criterion of the market.

In hematite pig iron the situation is somewhat similar, except that makers are sold out until mid-July. Unsold stocks have been practically absorbed. Foreign iron is no longer a menace.

Finished steel mills are improving their operations, but progress is slow. Shape mills are well booked, both with domestic and export orders, but plate rollers cannot yet operate regularly at full capacity. There has been a lull in demand from the shipyards since the Whitsun holidays, but new shipbuilding contracts have recently been placed and these in turn should benefit the plate mills. In some of the smaller branches business is quite active, small-sized bar makers, in particular, being heavily committed, as in certain districts freight rates from seaboard inland on foreign steel make the Continental product non-competitive.

Tin plate makers have been experiencing considerable activity as a result of regulation of output, and mills are sold ahead for some time. Consumption of tin plate the world over is expanding and plants are being erected in this country for fruit and vegetable packing.

Sheet mills have experienced keen disappointment. Virtually no business in light-gage sheets is coming from Japan, while producers of galvanized sheets are still awaiting the seasonal demand from India.

Heavy Stocks of Manganese Ore on Continent

HAMBURG, GERMANY, June 10.—Supplies of manganese ore in European markets are large and consumers' requirements are well covered. Recently trial lots of South African manganese ores have been shipped to German plants and the quality is reported to be excellent. At present prices for Indian manganese ore little business can be closed, but German users have bought Egyptian ore, from a new mine, which has the unusually high manganese content of 70 per cent. The price of manganese ore is about 11¾d. per unit.

German Cruiser Electrically Welded

Ship Now in Service Has Many New Features—Entire Naval Program Calls for Welded Construction

HAMBURG, GERMANY, June 10.—A German battleship now under construction at Kiel, which is not to exceed 10,000 tons displacement under the Treaty of Versailles, is to be all electrically welded. Meanwhile the new German light cruiser, Koenigsberg, has been placed in service. This ship, of 6000 tons, is the first cruiser to be all electrically welded, the saving in weight by welding being about 14 per cent. It has a speed of about 33 knots and has two separate types of engines—steam turbine and single-acting, two-stroke Diesel, the latter in use only when the ship is cruising. Her cruising radius is said to exceed that of light cruisers in other navies by about 3000 miles.

The stern is unusually long and low, being about 6 ft. 6 in. above the water. The hull differs from that of the usual cruiser, having been especially designed at Göttingen University with a view to minimizing resistance. The engines develop 63,000 hp., which is small for the speed of 33 knots. By comparison, the new French 10,000-ton cruisers have 170,000 hp., but travel only 1½ knots faster. The ship, which is long and narrow, can make a 35 deg. turn while traveling at 30 knots. All the new German destroyers, the next two cruisers and the battleship now under construction will be electrically welded.

American Textile Machinery Gaining Ground in Mexico

Although the first textile mills with power looms established in Mexico during the beginning of the nineteenth century were equipped with American machinery, it is estimated that now not more than 10 per cent of the textile machinery in use in Mexico for spinning and weaving is of American manufacture, says a report received by the Industrial Machinery Division, Department of Commerce, from Assistant Commercial Attaché Albert F. Nufer, Mexico City. This situation is not so discouraging, however, he pointed out, when taking into consideration the fact that the bulk of new equipment, imported by spinning and weaving mills established during the past decade, has been American and that American machinery dominates completely in the local knitting mills.

It is estimated that during recent years the United States has supplied Mexico with at least 75 per cent of its imports of spinning and weaving machinery. Mr. Nufer mentioned some districts which were visited and were found to be equipped almost entirely with machinery of English and French manufacture. Curiously enough, the lack of American machinery at these points appears to be due to its high efficiency. The automatic American equipment has proved so effective in output and in reducing the number of employees that its purpose has been defeated by the stipulations of the Mexican Textile Convention, which prescribes the minimum number of workmen to be employed in each mill.

Propaganda stating that American machinery does not stand up so well as European machinery evidently has had some effect, though perhaps not much. The fallacy of the propaganda is obvious. Actually, there is still in use some American machinery manufactured as long ago as 1837, though manifestly for efficiency and modern requirements it should be replaced.

German Steel Exports in Record Volume in April

HAMBURG, GERMANY, June 10.—German exports of steel in April reached a new record, partly as a result of an accumulation of shipments which were delayed in February and March by the severe winter weather and accompanying ice in rivers. Total exports were 619,460 tons, compared with 412,810 tons in April, 1928. The April total was also 273,000 tons greater than the March exports. All products showed increases.

Pig iron shipments were 30,600 tons, compared with 22,400 tons in March; semi-finished steel, 68,200 tons, compared with 24,700 tons; shapes, 141,500 tons, compared with 60,000 tons; plates, 37,800 tons, compared with 18,000 tons; tubes, 42,600 tons, compared with 30,300 tons; wire, 65,300 tons, compared with 36,500 tons, and wire nails, 7170 tons, compared with 4753 tons in March.

British Steel Merger Blocked

LONDON, ENGLAND, June 12.—It is announced that negotiations for the projected merger of Dorman, Long & Co. with Bolckow, Vaughan & Co. have been temporarily suspended. The two companies are the largest of the three great steel producers of Middlesbrough, which together have more than £14,000,000 of capital. As negotiations have been going on intermittently for a number of years, another suspension has not occasioned surprise.

Cartel Quotas Exceeded

HAMBURG, GERMANY, June 10.—In the first quarter all members of the International Steel Cartel exceeded their allotments. Germany had an excess output of 894,615 metric tons, France, 103,000 tons, Luxemburg, 33,390 tons, Belgium, 133,010 tons, and the Central European group, which includes Austria, Czechoslovakia and Hungary, 77,900 tons.

Keystone and Continental Merger Under Way

Negotiations are under way for a merger of the Keystone Steel & Wire Co., Peoria, Ill., and the Continental Steel Corporation, Kokomo, Ind., according to a statement issued by D. P. Sommer, vice-president of the Keystone company. This combination, if consummated, would bring together companies with assets of more than $25,000,000.

In the fiscal year ended June 30, 1928, the Keystone Steel & Wire Co. had a net income of $1,380,193 after all charges, including depreciation and federal taxes. This is equal, after preferred dividends, to $6.16 a share on 202,284 shares of no-par common stock. Net income of the Continental Steel Corporation for the year ended Dec. 31, 1928, was $1,009,887 after all charges, including depreciation and taxes, equal after preferred dividends to $5.12 a share on 171,511 shares of common stock.

New England Iron Trade Reelects Officers

At the annual meeting of the New England Iron and Hardware Association Tuesday evening, June 18, in Boston, retiring officers and directors, with one exception, were reelected. George E. McClintic, John B. Varick Co., Manchester, N. H., was made a director to succeed Charles A. Adams, who served for many years. Franklin E. Bragg, N. H. Bragg & Sons, Bangor, Me., is president, for a second term. William H. Bowe, Herrick Co., Boston, is vice-president, and George J. Mulhall, treasurer and secretary.

Resolutions in memoriam were adopted for Daniel F. Emery, president, Daniel F. Emery Co., Portland, Me., and George F. Blake, president, George F. Blake, Jr. & Co., Worcester, Mass., both of whom died recently.

Brown & Sharpe to Sell Machine Tools Direct

The Brown & Sharpe Mfg. Co., Providence, R. I., announces a change in sales policy, whereby it will be represented in Chicago, Detroit, Cincinnati and Cleveland in the sale of machinery and tools by the Brown & Sharpe Co., a newly organized sales subsidiary. The Brown & Sharpe Co. will take over sales in these territories on July 1, when arrangements with dealer representatives will terminate.

The Chicago office will be at 626 Washington Boulevard; Detroit office at 2842 West Grand Boulevard; Cincinnati office at 814 Chamber of Commerce Building, and Cleveland office at 424 Penton Building.

The personnel of the Detroit, Cincinnati and Cleveland offices has been announced as follows:

Detroit: J. G. Swinburne, machine tool representative; R. R. Grimes, Small Tool representative. Associates, J. A. Wagner, S. H. Sloan, H. R. Johnson, R. Martines, E. S. Thurston, A. Jack. Office executive, R. W. Dixon.

Cincinnati: G. C. Newell, machine tool representative; Associates, J. A. Waterman and R. W. Blakey.

Cleveland: W. H. Stewart, machine tool representative; J. H. Devlin, small tool representative. Associates, F. L. Pritchard, A. Gibson, F. K. Wilkey, and G. Manly.

The Brown & Sharpe Mfg. Co. will distribute small tools and cutters through the hardware and supply trade as formerly.

Connecticut Foundrymen Elect Officers

Carl S. Neumann, Union Mfg. Co., New Britain, Conn., was elected president of the Connecticut Foundrymen's Association at the annual meeting at Clearwater Inn, East Hampton, Conn., on June 14. Other officers named for the coming year are Burton W. Spencer, Bradley & Hubbard Mfg. Co., Meriden, vice-president; Charles S. Parker, Charles Parker Co., Meriden, secretary; and George R. Holmes, McLagon Foundry Co., New Haven, treasurer. In addition to the officers, the board of managers will consist of H. B. Brown, McLagon Foundry Co.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport; W. J. Maton, Waterbury Farrel Foundry & Machine Co., Waterbury; G. A. Ray, Taylor & Fenn, Hartford; and H. S. Washburn, Plainville Castings Co., Plainville.

Speakers at the meeting were George A. Richardson and Mr. MacDonald of the Bethlehem Steel Co. They discussed recent progress in pig iron.

New Equipment Expected to Raise Sharon Earnings

Sharon Steel Hoop Co., Sharon, Pa., has declared a quarterly dividend of 50c. a share on the outstanding no-par stock of the company. This is the first dividend declared on the no-par stock, the only issue the company now has outstanding. In recent years the old stock had been yielding 50c. a share semi-annually. It has been stated by the company that the net earnings applicable to dividends after all deductions were more than sufficient in the first five months of the year to take care of the dividends for the entire year, and it is expected that net earnings in the first six months of this year will be at least equal to the total net earnings of all of 1928.

Important additions to plant equipment, which have come into production in the last few months or are coming into production now, contributed little to the earnings of the first six months, but should make important contributions to net earnings hereafter. The new hot-strip mill is now breaking in with two turns. Demand for the company's products is good and, while some slight curtailment in demand may be expected in the next 60 days, this is not anticipated to be sufficient to decrease operations.

Bethlehem Awards Prizes for Accident Prevention

Accidents in the plants and mines of the Bethlehem Steel Corporation have been reduced approximately 63 per cent in the last 10 years. The corporation announced this improvement in connection with its fifteenth annual first aid and mine rescue meet, which was held on June 22 at Lackawanna, N. Y.

About $2,000 in cash prizes was distributed to the winning teams. Employees from all the Bethlehem plants and mines participated in the contest, which represents the final step in the graduation of 1000 men trained by the company each year in first aid, mine rescue, accident prevention and safety.

More than 9000 Bethlehem employees have received intensive instruction in safety during the last 13 years.

In addition to the first aid meet, Bethlehem's safety program includes a gold award accident prevention contest. Three cash prizes, totaling $1,750 in gold, are awarded each quarter to the groups of employees showing the best record during the period in reducing time lost as the result of accidents.

Buffalo Station Has Largest Signal Tower

BUFFALO, June 25.—Central Terminal, New York Central Railroad's newest passenger station, erected in East Buffalo at a cost of $14,000,000, was formally opened Saturday, June 22, in the presence of 2200 invited guests. The building is set upon a slight rise at Curtiss and Lovejoy Streets. The main concourse is 50 x 450 ft. Fourteen tracks guide the trains into seven parallel shelters of the terminal, which has in all 30 miles of rails. A feature of the station is the largest signal tower in the world, with 432 levers in each of two buildings. Before the eyes of the operators is an electrified diagram of the trackage commanded by each tower. A loudspeaker hookup keeps the operators informed of the destination of trains.

Buys Detroit Warehouse

The Jones & Laughlin Steel Corporation, Pittsburgh, has purchased the warehouse and business of Roehm & Davison, Beaufait Street and Mack Avenue, Detroit. The warehouse will be operated by the same organization which has functioned in the past, and a complete line of iron and steel products will be carried. The Jones & Laughlin company will take over the business on July 1.

Large Potential Markets for Sheets

Research Results Present at White Sulphur Springs Meeting Encouraged Trade Development Work

WHITE SULPHUR SPRINGS, W. VA., June 25.—Flat-rolled steel executives are holding a three-day conference here that will be concluded with an address Wednesday morning by President Farrell of the Steel Corporation on trade development.

The National Association of Flat Rolled Steel Manufacturers, a merger now about 15 months old of the National Association of Sheet and Tin Plate Manufacturers and the hot and cold-rolled strip institutes, is sponsor for the meeting. A number of companies not heretofore identified with the movement are present.

A study of potential markets presented by advertising agencies, one in respect to farm buying possibilities by the Griswold-Eschleman Co., Cleveland, and the other for the industrial field by the Gardner advertising agency, made a profound impression. Some illustrations of results from the association's advertising, particularly in the emphasis on steel as a selling feature of the fabricated products, were accepted as fully justifying the association policy. The room used for the Monday morning session was well decorated with examples of the association's campaign to convince rural populations that "galvanized sheets protect" and urging the urban communities to "save with steel."

The farm analysis points to an annual replacement market in galvanized roofing of 22,500,000 squares, or 1,125,000 tons, which with new construction brings the total potential demand to 1,600,000 tons, against which the present estimated consumption is 429,000 tons.

Farmers Receptive to Sheet Steel

The research showed a surprisingly large percentage of farmers highly receptive to sheet metal, not alone for roofs but for varied equipment about the farm. Of the roofing sold to the farmer, 48 per cent was distributed by the hardware dealer, 27 per cent by lumber yards (presumably in these cases when wood shingles could not be sold), 10 per cent by mail order houses and 8 per cent by roofers.

In respect to consumption possibilities in the industrial field, Mr. Bettle of the Edward G. Budd Mfg. Co., Philadelphia, calculated that the difference in the weight of steel in the all-steel sedan body and the composite body could be put at an average of 232 lb., and for the 3,441,500 cars of that general type made last year the extra amount of steel would thus amount to 399,000 tons. His own company consumed in the first quarter of this year over 50,000 tons of sheets.

Warwick Furnace Makes Final Settlement

Final settlements have been received by the Warwick Iron & Steel Co., 1500 Walnut Street, Philadelphia, from purchasers of the company's blast furnaces and other property at Pottstown, Pa. Accounts of the company have been audited and following deposit of stock with the Real Estate Land Title & Trust Co., Philadelphia, shareholders will receive $1.09½ for each share of capital stock, originally issued with a par value of $10.

Southwestern Manganese Ore Can Be Concentrated

Experimental work conducted at the Mississippi Valley Station of the United States Bureau of Mines, Rolla, Mo., in cooperation with the Missouri School of Mines and Metallurgy, has indicated that certain low-grade manganese ores from the Southwestern States, notably New Mexico, can be concentrated into merchantable products. All of the ores examined from this section are characterized by their low phosphorus content, and many of them contain siliceous gangue that can be rejected by jigging and tabling.

Numerous deposits of manganese ores occur in the Southwestern States, and as yet only a few of them have been studied as to their amenability to concentration. It is essential that these deposits be given careful consideration, for, while it might be uneconomical to mine and mill some of them under present market prices, they would constitute an important reserve that could be drawn on during periods of national necessity.

Los Angeles Firm Redesigns Spot Welder Line

A complete new line known as "Acme Hot Spot" welding machines has been developed by Acme Electric Welder Co., Huntington Park, Los Angeles. Distinctive features are numerous malleable iron working parts, to insure against breakage; a hand-contact switch operating with easy thumb pressure; an extra heavy toggle type 360-deg. bonnet swivel head; a clamping device which holds the lower swivel in any desired position without marring the copper column; extra heavy secondary, horns, horn holders, column, electrodes and other copper conductors, providing high electrical efficiency. Capacity ranges from 7½ to 100 kw., measured at the electrode, with current from the highest tap. Transformers are capable of 100 per cent overload.

An "aeroplane cooler" keeps the transformer secondary from overheating, even under the most severe working conditions.

May Sheet Production a Record—Sales Drop

Production and shipments of steel sheets by independent makers broke all records during May, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. Production amounted to 393,430 net tons, compared with 375,256 tons during April. Shipments were 392,336 tons, as compared with 377,274 tons during the previous month. With the falling off in buying by the automotive industry, sales, which amounted to 279,783 tons, declined over 100,000 tons as compared with April. With increased shipments and lighter sales, the unfilled tonnage declined sharply, although mills still had a large tonnage of unfilled orders on their books June 1. The May report and comparisons, in net tons, follow:

	May	April	March
Total number of mills	722	722	722
Capacity per month	502,600	482,000	468,200
Percentage reporting	67.6	67.6	67.6
Sales	279,783	398,206	464,397
Production	393,430	375,256	364,202
Shipments	392,336	377,274	363,648
Unfilled orders	713,568	835,801	791,615
Unshipped orders	119,535	121,164	125,653
Unsold stocks	48,334	54,142	63,397
Percentages of Capacity			
Sales	82.4	122.3	146.8
Production	115.8	115.2	115.2
Shipments	115.5	115.9	115.0
Unfilled orders	210.1	256.8	250.3
Unshipped orders	35.2	37.2	39.7
Unsold stocks	14.2	16.6	20.0

Mexico Buys Woodworking Machinery

Within three or four years Mexico is expected to be a favorable market for American woodworking machinery, according to the Industrial Machinery Division, Department of Commerce. The woodworking industry in Mexico is beginning to realize that to meet competition it will be necessary to reduce costs.

American exports of woodworking machinery to Mexico in 1928 were valued at $106,329. Approximately 50 per cent of this type of machinery used in Mexico is of American manufacture, the remainder being German and French equipment. The report says that one important factor in impeding sales of modern American machinery and equipment in Mexico is the shortage of skilled labor.

20,000-Ton Order for Pipe

The A. O. Smith Corporation, Milwaukee, manufacturer of electrically welded pipe, has received an order for a 100-mile pipe line to be laid from Petrolia to Fort Worth, Tex., for the Lone Star Gas Co. The line will require about 20,000 tons of 20-in. pipe.

This Issue in Brief

Structural steel, in use 42 years, found to be in good condition. Tests reveal no evidence of deterioration in the crystalline structure. Original paint markings were fresh and bright.—Page 1780.

* * *

End of prosperity wave is not yet in sight, say industrial statisticians. The generally expected "more than seasonal decline" has not materialized, and conditions are much better than anticipated.—Page 1780.

* * *

High resistance to corrosion together with extreme surface hardness renders nitrided articles desirable for many purposes. As unpolished surfaces offer greatest resistance to corrosion, it is preferable to forego subsequent polishing, where high resistance is desired.—Page 1760.

* * *

Sheet-metal fabricators should allow the supplier a breakage tolerance based on experience with the particular job in hand, says sheet manufacturer. During the trial run, the supplier should not be responsible for breakage. If irregular results develop, buyer and seller should each stand half of the breakage in excess of best previous run.—Page 1769.

* * *

Migration of industry is slight, survey reveals. Less than 10 per cent of plants gained by communities surveyed (representing 75 per cent of the urban population of the United States) moved from another section. The Middle Atlantic States made the greatest gain from relocations. —Page 1770.

* * *

Wire-drawing costs, using Morgan-Connor semi-continuous machines, averages $1.69 per 1000 lb. of wire, for No. 12½, 13 and 13½ gages.—Page 1765.

Electric welding makes a 14 per cent saving in weight of new German light cruiser, fabricated completely by welding. The saving in weight permits larger cruising radius, together with fuel economies.—Page 1782.

* * *

Hard castings can be eliminated by using special pig iron containing alloys, says maker. The new pig iron contains manganese and silicon, besides nickel and chromium.—Page 1768.

* * *

Before nitriding, be sure that strains set up during manufacturing are removed. Otherwise warping or distortion may result, especially in parts having widely varying thicknesses of section. Cold-straightening can be done. Hot-straightening will not harm the case, as it is not affected at 1000 deg. Fahr.—Page 1759.

* * *

Gas-welded industrial building frame erected in same manner as would have been followed if riveted. About 75 per cent of welding of 298-ton building was done in the shop and 25 per cent in the field. Shop welding cost is estimated at $13.70 a ton, and estimated saving in steel was 10 per cent, bringing the net shop cost within the commercial range. —Page 1762.

* * *

Production methods employed in manufacturing big rigid airship. Instead of following the Zeppelin practice of building the airship in place, the sections are made separately and are erected by bolting together.—Page 1753.

* * *

Slight "growth" during nitriding should be allowed for. This can be provided for in the final machining or grinding before nitriding, or can be removed afterward by lapping or by other suitable means.—Page 1759.

Without reasonable protection from foreign competition steel industry wage rates may suffer, says producer. Tells tariff committee that adequate protection should be given domestic producers and that tariff should be cut on raw materials not produced at home.—Page 1775.

* * *

Gas welding appears best for thin material and in cases where an exceptionally smooth finish is required, says electrical engineers' committee. Metallic arc is declared to be fastest in hand welding, for general repair work, and structural welding.—Page 1764.

* * *

New era in structural materials ushered in by extensive use of stainless steel in 724-ft. airship, says engineer. This material proves to be lighter than duralumin for a given strength in the sections used.—Page 1753.

* * *

Unexpected spring fractures may be due to skin on the leaves of the spring, say British investigators. Endurance tests reveal that alloy steel laminated springs give little if any better results than carbon steel.—Page 1758.

* * *

Die castings of aluminum-silicon alloy (10 to 14 per cent silicon) are used in airship construction. One-inch test pieces have a minimum ultimate tensile strength of 27,000 lb. per sq. in., and minimum elongation in 2 in. of 7 per cent.—Page 1756.

* * *

Sweeping iron and steel freight rate change to become effective on or before Oct. 20. Interstate Commerce Commission prescribes basic mileage scale for carload shipments. Long-haul rates are generally reduced; many short-haul rates are raised. —Page 1778.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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The New Steel Freight Rates

IN establishing a basic mileage scale for freight rates on iron and steel products in official classification territory, the Interstate Commerce Commission brings the steel industry face to face with a distribution problem second only to that involved in the Federal Trade Commission order of five years ago abolishing Pittsburgh basing. Revolutionary as was the change of July, 1924, however, it naturally did not affect the rate structure itself, whereas the decision just given carries with it an entirely new set-up of freight rates applicable to 90 per cent of the country's steel output.

In contrast with the 25 per cent rate increase of 1920, which affected all iron and steel shippers and all their products, the present order raises some rates and reduces others in the complicated rate scheme built up since the beginning of steel making in the territory lying east of the Mississippi and north of the Ohio and Potomac rivers. Thus competitive relationships are altered to a degree that takes away advantages long enjoyed by certain districts and in varying measures confers them upon others. The decision reduces many long-haul rates, though some of these are increased, and many short-haul rates are raised.

The so-called middle district, embracing Pittsburgh, Youngstown, Cleveland and Wheeling, is most advantaged by the changes. Pittsburgh mills, for example, get reductions to Atlantic seaboard points amounting to 80 cents a ton to Baltimore, 60 cents to Philadelphia and 20 cents to New York.

A sweeping change is the wiping out of the blanket rate to New England. Boston, which, in common with all other New England cities, has paid a freight rate of 36½ cents per 100 pounds from Pittsburgh, will now have to pay about 40 cents. All New England cities, except some in the southwestern portion, will pay higher tariffs.

Other marked changes are in the Chicago and Pittsburgh rates to St. Louis. The Pittsburgh-St. Louis rate is lowered to 39 cents and the Chicago-St. Louis rate is increased to 26 cents, thereby lessening the spread between the two from 19 cents to 13 cents, which gives Pittsburgh mills that much more of an opportunity to compete in the St. Louis district. The delivered price on bars at St. Louis from Pittsburgh, based on 1.95 cents, will be 2.34 cents, against 2.31 cents from Chicago, based on 2.05 cents.

Eastern mills will pay slightly higher rates into New England, but the advance to them will be less than the advance in the rates to New England from Pittsburgh. For example, the Pittsburgh-Boston rate is increased 3½ cents, while the rate from Bethlehem, Pa., to Boston is made only 1½ cents more than at present.

Mills in the Philadelphia group will have lower rates to New York, putting them virtually on a parity with Bethlehem, Pa., in shipping to New York; on the other hand, Bethlehem gets a reduced rate to Philadelphia.

So far as the carriers are concerned, the result of the order is not greatly significant. Commissioner Whitlock estimates "a reduction of $2,500,000 and perhaps more" in annual revenues; on the other hand is the opinion that a net increase may result. As with the steel producers, some roads will lose while others will gain.

It is already evident that the response of shippers to the new rates will represent as great a conflict of interest as has developed in the long-drawn hearings of the past two years. The commission has disregarded the scales proposed by carriers, which would have resulted in increasing generally the present level of steel rates, and on the other hand it has denied reductions urged by steel producers, which would have made heavy inroads on railroad revenues. Apparently it has been chiefly concerned to build an orderly rate structure and to reduce to a minimum the instances in which existing rates are prejudicial and inconsistent. Yet it could not be expected that all of the ills inherited from the regime of Pittsburgh plus and those arising under the new competitions that date from the order of July, 1924, will be cured by a single decision or that any steel producer will view with equanimity the prospect of increased freight absorption to hold hard-won business.

A Bounty on American Manganese

SINCE the hearings on tariff revision began, the press has had much to report on the conflicting claims of the producer (who wants more protection) and the consumer (who wants lower prices). The issue is drawn especially clearly in the debate over the manganese schedule between steel producers, who must use ferromanganese, and the American Manganese Producers' Association, which would like to mine manganese ore under a high duty. In the House of Representatives, the argument of the one for lowered rates neutralized the plea of the other for even higher duties, and the result was no change.

Now that the Senate has refused to instruct the Finance Committee to confine amendments to the agricultural sections, the manganese issue comes up afresh. Signs are not lacking, however, that unless

some new viewpoint is gained the situation will remain as it is.

Briefly, the American Manganese Producers say that an even higher tariff on imported manganese ore and on ferromanganese is necessary to produce an artificial price level in the United States and thus enable the producers of high-grade ore to continue to mine and develop their deposits, and to encourage owners of low-grade ore to devise, install and operate concentrating plants. A committee from the American Iron and Steel Institute, speaking for the steel industry, is just as sure that our meager supplies of high-grade ore are being depleted by the present duties, that no new concentration processes have been proved practicable, and that those now in use (nodulizing, washing and magnetic concentration) are old and their limitations are well understood. In effect the steel industry contends it is being taxed at the rate of $8,000,000 a year, and this tax is passed along to every purchaser of an article made of steel, to foster an industry which cannot possibly develop.

Is there agreement between these contenders on any points? There is little question that manganese is an essential mineral. It heads the War Department's list of strategic minerals. On all hands it is agreed that the American supply of high-grade ore (containing 47 per cent or more of manganese and no harmful ingredients, and capable of smelting directly into ferromanganese in the conventional way) is quite limited, and the chances of discovering bonanza deposits are few. There is no question that we have enormous quantities of more or less complex ore containing 30 per cent or less of manganese (most of it running under 10 per cent). Large deposits of easily smelted, rich ore have been developed in several foreign countries, competition is open, and under free trade the price would settle to a basis of cost plus proper operating profit. Even in the face of this situation, few would dispute that it would be desirable to build up a manganese industry in America engaged in concentrating the lean ores. It would develop our own resources, employ a considerable body of men, directly and indirectly, and give the nation an operating industry, which could be a dependence in case of war.

THE IRON AGE desires to restate here the editorial position taken in 1921 when the present tariff bill was being written; namely, that a high tariff on the raw material manganese ore is contrary to sound economics, is really a revenue tax on the consumer of steel, and is hastening the exhaustion of a valuable and meager natural resource. But we also would state more forcibly an added thought, expressed several months ago in these columns, that a bounty might well be paid on ferromanganese made from concentrates gained from low-grade American ore.

These two propositions are supplementary in the truest sense, and form the meeting ground for the apparently irreconcilable attitudes of manganese miner and steel producer. If it will cost us 1½ cents more to produce a pound of manganese metal in a concentrate than it does to buy a pound of manganese metal in high-grade foreign ore (as the American Manganese Producers' Association says) and it costs us ¾ cent more to smelt it into ferromanganese than it costs a Norwegian to do the same thing (as the American Iron and Steel Institute avers) then let us pay a bounty of 2¼ cents for American ferromanganese made from American concentrates. Supposing we are able to supply 10 per cent of our requirements from such home sources, the revenue for such a bounty could be raised by a tariff on the remaining imports of only ¼ cent per pound of manganese, in place of the present 1 cent duty.

Some such plan is calculated to satisfy the contending parties in their major desires. The steel industry would get a much lower duty. The manganese producers would be encouraged to develop concentration processes. The manufacturing consumer of steel would be relieved of practically all the present tax on his raw material and the way be opened for a new industry which would serve as a partial reliance in any national emergency.

Waves in Automobile Buying

WHEN automobile production during the last few years is studied carefully, some important points are brought out which are not caught by the rough consideration usually given. The study may be confined to the last six and a half years, for prior to 1923 production was relatively light. There has been such a tendency for a calendar year to combine a good half and a bad half that calendar year comparisons do not disclose the real swing. There have been much smaller percentage variations between calendar years than between years ended June 30. For instance, by a calendar year comparison 1925 and 1926 appear to be good years, with the second less than 2 per cent above the first, but comparing years ended June 30, that of June 30, 1926, is 20 per cent above its predecessor and 10 per cent above its successor.

After a careful scrutiny of the course of production one is strongly inclined to believe that the public tendency to buy automobiles runs in waves, one purchase bringing on another. Then, when every one is pretty well satisfied, there is a lull. Production was particularly heavy up to the middle of the year 1926, and then for nearly two years, allowing for seasonal variation, it was relatively light. Since the middle of last year it has been very heavy, so that the twelvemonth now ending stands far above any other 12 consecutive months. The point is emphasized in the table below, showing total car and truck production, United States and Canada, in years ended Dec. 31 and June 30. This month's production is estimated by allowing the average seasonal variation from May:

Automobile Production in Years Ended Dec. 31 and June 30

	Dec. 31	June 30
1922	2,646,229	2,067,883
1923	4,180,450	3,580,145
1924	3,737,786	4,153,466
1925	4,427,800	3,878,296
1926	4,505,661	4,665,925
1927	3,580,380	4,224,705
1928	4,601,141	3,706,078
1929	.....	5,680,000

It is not often that a table of statistics can be used in a study of human nature, but we believe a case is here presented. The automobile, rather than the apparel, now proclaims the man. One can hardly believe that automobile failures run in spells, and as to total income of the people there has merely been a steady increase since 1921 while the general living cost has not greatly varied from year to year. Why, then,

these big swings in automobile demand, unless it is a matter of buying when everybody is buying, and vice versa? Why, with production in the year ended June 30, 1926, at 4,665,925, should there be successive declines to 4,224,705 and 3,706,078 and then a jump to 5,680,000 in the year now ending?

Here is evidently a wave of automobile buying. One may admit that without committing himself as to how much longer it will continue. The fact that last April followed the average in being the peak month and the further fact that to date we cannot observe any more than average percentage decrease in production indicate that the movement as such is not over.

It would be rash to ascribe much of the recent variation to Ford, because when Ford model-T production ceased at the end of May, 1927, production of other cars also ran light for some time. A year and a half ago some observers suggested that a "deficit" had accumulated. Probably there was something in that, in the sense of its being a mental rather than a physical deficit. Also there is room for conjecture that cars are not being asked to last as long as formerly, but in that, again, the popular taste may swing about.

International Investments

JUST issued by the Department of Commerce, "The Balance of International Payments of the United States in 1928" constitutes the seventh annual report on this subject. Reference to these reports discounts very considerably the claims that we have been exporting our capital too freely, that because of what may briefly be called compound interest we have set a pace that cannot be followed indefinitely, and that accordingly we are in danger of loss.

The sum total of foreign securities offered in the United States in the ten calendar years since the war is about $10,400,000,000. Adding allowances for private purchases and for sums due the United States by foreign governments, a total much above ten billion dollars is obtained, which is rather alarming, for the public, while unable to grasp the figures precisely, has a general idea that billions are dangerous.

However, various deductions are to be made when one considers the matter from the standpoint of the net outflow of capital from the United States, which is the same thing as the increase in the amount owed us by the rest of the world. Using the figures just issued for last year, the par value of foreign securities offered in the United States in 1928 was $1,483,000,000. First there are deductions of $63,000,000 for securities issued below par and of $59,000,000 for American underwriters' commissions. Then there is an estimate of $237,000,000 for refunding to Americans, no small sum considering the inference in some quarters that we are not getting anything back on old loans apart from accepting additional securities. With the three deductions just mentioned we have a net amount of $1,124,000,000. The deductions amount to about one-fourth of a sum that is likely to be paraded as a full addition to our investments abroad.

It is true there were other foreign investments by Americans, which should be added to the net figure just mentioned. Estimates are $378,000,000 of "direct investments" abroad and $568,000,000 of foreign securities bought by Americans from foreigners in small lots, making $946,000,000, or nearly another of the formidable billions. Here, however, we have an almost complete offset—$853,000,000—in bond redemption payments received from foreigners, sinking fund payments, resale to foreigners of direct investments, and foreign securities resold to foreigners.

There is a class of transactions sometimes overlooked. In this international business we are not exclusively dealing in foreign securities. Last year, in American securities, we bought back from foreigners $1,153,000,000 and sold to foreigners $1,634,000,000, indicating an item of about half a billion on the other side of the balance sheet.

It is quite impossible here to summarize the whole matter. What we are suggesting is that this whole business is not so formidable nor so promising of trouble as many commentators would have us believe. As to our returns being more or less doubtful, it is estimated that last year we did receive $817,000,000 as interest, this being entirely separate from the sinking funds and redemptions referred to above. Our merchandise trade balance last year was over a billion dollars and the general view is that exports which made such a balance possible were profitable, not only to the sellers of the merchandise but to the country at large.

Not All the People All the Time

HIGH-PRESSURE salesmanship is going out, probably for the reason that it was becoming so general that the public naturally built up its own protection. Buncombe in publicity is also losing its effect. Of what use to startle to gain attention, if at the same time confidence is shaken? Worse than foolish is misrepresentation, when the reader feels that his intelligence is outraged.

It was inevitable that the public would tire of extravagant claims for consumption goods, backed up at times by purchased testimonials from social leaders, athletes or moving picture favorites. Nor is it surprising that sensational propaganda has made many readers skeptical of much else that is printed. Amateur psychology must be revised. The belief that any assertion, if repeated often enough, will be widely accepted as truth needs to be reexamined.

The theatrical, the sensational, the outlandish still have a place in tabloid journalism, but they carry no general appeal. A stable-minded public that honors a Coolidge, a Hoover, or a Lindbergh is growing better able to distinguish the genuine from the make-believe.

The demand for unbiased, capable, dependable journalism has long been met by responsible publications in both general and specialized fields. Their success has been built on merit and on keeping faith, and not on legerdemain or vociferous claims of influence and coverage. Public distrust of the "biggest and best" has been growing healthily ever since Barnum cataloged the species of which one was born every minute. Also, Mr. Lincoln was right as to the number of people who could be fooled part of the time or all of the time.

Use of a special glass which prevents glare is one of the features of new instruments for switchboards introduced by the General Electric Co. The special glass, in combination with anti-parallax scale and pointer, facilitates reading, regardless of the angle from which the instrument is viewed.

Worcester Reed Warner Dies in Germany

WORCESTER REED WARNER, a pioneer and long a distinguished leader in the machine tool industry, and formerly president of the Warner & Swasey Co., Cleveland, died at Eisenach, Germany, June 25, at the age of 83 years. He had been traveling with his family in Europe since early in May.

Mr. Warner held various executive positions with the Warner & Swasey Co., including the presidency and chairmanship of the board. He retired in 1911 and moved to Tarrytown, N. Y.

The company, under the joint management of Mr. Warner and Mr. Swasey, became one of the leading machine tool builders in the United States, and, in addition, became known the world over as a builder of telescopes and various precision instruments.

He was born in Cummington, Mass., May 16, 1846, the son of Franklin J. and Vesta Reed Warner and descendant of long lines of Puritan ancestors, including Francis Cooke of the Mayflower. The family home, built in 1779, still stands, having housed five generations of Warners, one of them a captain in the Revolutionary Army.

Worcester Warner was educated in the village schools of Cummington and early developed a strong taste for mechanics and the sciences. At the age of 19 he went to Boston, where he secured employment in the engineering office of George B. Brayton, one of the most eminent mechanical engineers of his time. The following spring the offices were moved to Exeter, N. H., where the Brayton engines were made, and for three years young Warner was Mr. Brayton's assistant in the designing and construction of the Brayton engines and boilers.

In 1869 Mr. Warner entered the employ of the Pratt & Whitney Co. in Hartford, Conn., where he remained for 11 years, during eight of which he was foreman of one of the departments. During that period he devoted much time to the pursuit of his favorite scientific studies, especially astronomy, and experimenting with telescope building as a recreation, thereby anticipating what later brought him world fame.

In 1881 he associated himself with his long-time friend and shopmate, Ambrose Swasey, establishing the firm of Warner & Swasey in Cleveland, later the Warner & Swasey Co., manufacturing machine tools. Owing to Mr. Warner's studies in astronomy, it became evident to him that, with the increase in the size of telescope lenses, the mounting of them had come to be a work of engineering, properly to be undertaken by his company. It has designed and constructed many of the largest telescopes in existence, including the 36-in. Lick, the 40-in. Yerkes, the 26-in. of the United States Naval Observatory, the 72-in. of the Dominion Observatory of Canada, the 60-in. of the Argentine National Observatory, etc., besides the astronomical equipment for many other colleges and universities of this country; and, for the United States Government, instruments of precision, such as range-finders, gun-sights, field telescopes, etc.

W. R. WARNER

Mr. Warner was for many years a prominent resident of Cleveland and was one of the earliest presidents of the Cleveland Chamber of Commerce and active in all civic welfare movements of that city. He was a trustee of the Society for Savings and the Guardian Trust Co., Western Reserve University, Case School of Applied Science and Cleveland School of Art.

In 1897 he received the degree of doctor of mechanical science and in 1925 that of doctor of engineering. He was also fellow of the A. A. A. S. and F. R. A. S. and member American Astronomical Society and British Astronomical Society, past president and honorary member of the American Society of Mechanical Engineers, also member of the Society of Mayflower Descendants.

In 1890 Mr. Warner married Miss Cornelia Blackmore, also of Cleveland. In 1910, when he moved with his wife and daughter, Helen, to Tarrytown, N. Y., he built a private observatory and also a well-appointed machine shop, continuing his interest in designs and inventions, mechanical and scientific.

Mr. Warner had traveled extensively and was well known as a collector of rare Chinese porcelains and other curios, some of which constitute the Worcester R. Warner collection of the Cleveland Museum of Art. He also contributed largely to educational institutions, church benefactions, etc., and in 1923 built a community house for his native town, Cummington, Mass.

Screw Thread Commission Issues Revised Report

ALTHOUGH for the most part the same as the 1924 publication, the revised report of the National Screw Thread Commission, which is being issued as Miscellaneous Publication No. 89 of the Bureau of Standards, contains important new material and several revisions.

Designation of the screw thread standards promulgated by the commission has been changed from "national" to "American National," and specifications for threading tools have been extensively revised and are now included as an appendix. Sizes above 1½ in. to the fine thread series, but with coarser pitches than those in the progress report of 1921 have been added. Tolerances on minor diameter of nut have been increased over the range of sizes smaller than 1⅛ in., of the coarse and fine thread series, and a 3-in., 3½ threads per in. size has been inserted in the coarse thread series. Tables of specific pitch diameter tolerances for threads of special diameters, pitches and lengths of engagement have been substituted for the method of determining such tolerances by adding together increments, thus establishing consistency with the pitch diameter tolerances specified for the regular thread series.

New material added to the body of the report includes specifications for wrench head bolts and nuts and wrench openings. There is an outline of standard practice for Acme threads, screw threads for oil well drilling equipment, standard hose connections for welding and cutting torches; rolled threads for screw shells of electric sockets and lamp bases; and a 12-pitch thread series.

Useful data added to the appendixes include standard designs of plain and threaded plug and ring gages; specifications covering class 5, wrench fit for threaded studs; common practice as to thread series and class of fit for screws, bolts and nuts; and wire methods of measuring thickness of Acme threads.

The revised report covers 261 pages 6x9 in. and may be obtained from the Superintendent of Documents, United States Printing Office, Washington, at 50c. a copy.

Iron and Steel Markets

Summer Recession in Output Slight

Weather and Wear and Tear on Equipment Are Factors— Railroad and Structural Demands Buoyant—Rate Decision Alters Competitive Relationships

SUMMER is bringing a recession in the activity of the steel industry, but thus far hot weather and the physical limitations of equipment have affected mill operations more than market conditions.

While open-hearth steel output has apparently diminished, with a larger number of furnaces reported down for repairs, Bessemer steel production has gained. The recent hot wave has chiefly restricted the production of sheet and tin plate mills and has not materially relieved the demand for crude steel. Meanwhile total ingot output remains at close to 100 per cent of rated capacity, with little prospect of dropping more than 2 or 3 points before July 1.

Improvement in mill deliveries is more general, now being reported from Chicago where producers' commitments are largest, but unfilled business is still heavy and a high rate of production next month is assured. The automotive industry has further curtailed operations and some motor car builders, in preparing to bring out new models, have made a 50 per cent reduction in steel tonnage on order and in stock. The trend is not all in one direction, however, since a few instances of increased specifications for automotive steels are reported.

Tin plate specifications continue to taper, reflecting in part the prospect of reduced packs of canned goods. Independent tin plate mills may shut down all of next week on account of the Thursday holiday.

Farm equipment plants are taking less steel. Part of this reduction is attributed to seasonal influences, but some of it is ascribed to the uncertainty of the agricultural outlook. Northwestern implement manufacturers and tractor makers generally have made the sharpest cuts in production.

No general decline in steel demand has developed. The requirements of railroads and construction work are expected to increase rather than diminish. The week's railroad equipment purchases include 4000 steel box car bodies for the Pennsylvania and 25 additional locomotives for the New York Central. Rail options are being exercised in full, further prolonging the present rate of rail mill operations. Capital expenditures of the railroads in the last three quarters of the year, according to announcement by President Aishton of the American Railway Association, will exceed those of the corresponding period in 1928 by $111,000,000.

Structural steel awards, at 61,000 tons, were well above the weekly average. Over 1,000,000 tons of fabricating work is in early prospect of being placed, according to a leading steel company's survey of pending structural tonnage throughout the country.

Pipe line commitments have been augmented by an order for 20,000 tons of 20-in. pipe, placed with the Milwaukee fabricator, for a 100-mile line from Petrolia to Fort Worth, Tex. Oil tank lettings total 9700 tons, and fresh inquiry for tankage calls for 10,000 tons of plates.

Competitive relations between steel-producing districts will be materially altered by the decision of the Interstate Commerce Commission establishing a mileage scale of freight rates on iron and steel products in Official Classification territory. Second only to the Federal Trade Commission order abolishing Pittsburgh "plus" in its effects on steel distribution, the decision establishes an entirely new set-up of rates for 90 per cent of the country's mill output. The mileage scale, intended as an orderly and logical structure calculated largely to wipe out inconsistent and prejudicial rates, will chiefly benefit producers in Pittsburgh, Youngstown, Cleveland and Wheeling. An incidental result is the abolition of a blanket rate to New England points.

The renewal of steel contracts for third quarter has been rather general, and in many cases consumers have asked for the same tonnage as in the expiring quarter. Some contract business in slabs has been placed at $34, Pittsburgh, or the same price that ruled on most second quarter tonnage. The quotation of $36, recently current, has mainly governed on spot business.

On black and galvanized sheets 2.85c. and 3.60c. a lb., Pittsburgh, or $2 a ton below the last announced advances, have become more common; on the latter product jobbers have been able to cover their requirements at 3.50c.

Pig iron contracting is gaining some headway, although in general not brisk. Sales at St. Louis totaled 28,000 tons, and more consumer interest is evident at Pittsburgh. Along the Eastern seaboard the market has been unsettled by Alabama furnaces, which are pressing the advantage of lower water-and-rail rates. In the Central West, as a result of the slowing down of the automobile industry, pig iron shipments have declined and considerable second quarter tonnage will be carried into July.

Exports of iron and steel in May, at 262,000 tons, showed a decline of 16,000 tons from April, while imports made a gain of 74,000 tons, ascribed to prospective increases in duties. Exports for the first five months were 1,344,000 tons, compared with 1,097,000 tons in the corresponding period last year.

Both of THE IRON AGE composite prices are unchanged, pig iron at $18.63 a gross ton and finished steel at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous. Advances Over Past Week in Heavy Type, Declines in Italics

	June 25, 1929	June 18, 1929	May 28, 1929	June 26, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.76	$21.76	$21.76	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	18.69	18.69	18.69	19.19
No. 2, Birmingham	15.00	15.00	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	15.75
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	*34.00*	35.00	36.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	36.00	33.00
Slabs, Pittsburgh	35.00	35.00	36.00	32.00
Forging billets, Pittsburgh	*39.00*	40.00	41.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	June 25, 1929	June 18, 1929	May 28, 1929	June 26, 1928
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.25	$18.25	$17.75	$14.25
Heavy melting steel, Phila	16.00	16.00	16.00	13.00
Heavy melting steel, Ch'go	*14.75*	15.00	15.25	12.50
Carwheels, Chicago	*14.00*	14.25	14.50	13.00
Carwheels, Philadelphia	16.00	16.00	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.00	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	15.00	13.50
No. 1 RR. wrot, Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	14.00	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.87½
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	*44.25*	44.62½	43.37½	46.25
Zinc, East St. Louis	**6.70**	6.65	6.60	6.15
Zinc, New York	**7.05**	7.00	7.00	6.50
Lead, St. Louis	6.80	6.80	6.75	6.15
Lead, New York	7.00	7.00	7.00	6.30
Antimony (Asiatic), N. Y.	8.75	9.00	9.00	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Demand Still Tapering Off But Operations Are Unaffected Except By Hot Weather

PITTSBURGH, June 25.—The gradual tapering off in steel demand, which began late in May, is still in evidence, but has not yet gained any marked proportions. In many cases declines in specifications have been greatest on products which had previously been most active, and, as a result, demand for steel is probably more evenly distributed than was the case a month ago. Such products as pipe and wire, which were rather sluggish in April and May, have improved materially, and the close of the first half of the year finds operations well diversified and shipments of nearly all products holding at a considerably higher rate than is to be expected at this season.

The automobile industry is still taking steel in large quantities, despite reduced production schedules of a number of companies. Heavier specifications from at least two of these plants in the last week indicate higher operating schedules during the summer months. Unless other consuming lines which have been taking steel freely curtail their requirements rather suddenly, steel operations during July and August are not likely to fall very much below the maximum possible in the hot months of the year.

Sheet and tin mill activity was seriously curtailed by the heat last week, and the approaching mid-week holiday is expected to hinder production next week, particularly in the tin mills.

Open-hearth furnaces in this and nearby districts continue at about capacity, but a number are down for repairs and total production is probably somewhat lower than it was earlier in the month. Bessemer operations, however, are higher, probably averaging 75 per cent of theoretical capacity.

Forward buying is somewhat more active than it has been, and most of the large buyers of finished steel are now under contract for the third quarter.

Maximum second quarter quotations were adhered to on most of this tonnage, but fresh weakness has developed in galvanized sheets, and jobbers have been able to cover their requirements at 3.50c., Pittsburgh, a decline of $2 a ton from recent minimum quotations. On black sheets, 2.85c. seems to be the minimum price, and this is extended only to large buyers, with 2.95c. generally quoted. Occasional price concessions are also reported on nails and wire, but not in the immediate Pittsburgh district.

Mills have made no announcement regarding third quarter prices on semi-finished steel, but at least one instance of renewal of a second quarter contract on slabs at $34, Pittsburgh, for a part of the third quarter, confirms the opinion of part of the trade that any general advance is unlikely. Sheet bar contracts have also been renewed at $35, and higher prices merely represent quotations on spot business.

Pig iron is beginning to show more life. A few large users have come into the market during the past week.

Scrap is dull, and, with no sizable transactions reported during the week, quotations are unchanged.

Semi-Finished Steel.—Formal announcement of third quarter prices on

semi-finished steel is still lacking in this district, but a few contracts have been closed in this and nearby districts at $35, Pittsburgh or Youngstown, for sheet bars. This is the same price which prevailed during the quarter now ending and represents a decrease of $1 a ton from the current quotations on spot business. On billets and slabs, a producer in a nearby district is said to be taking business at $35, an advance of $1 a ton over the second quarter price, but sellers in the Pittsburgh territory have not stated their intention of meeting this quotation. Buyers of this form of steel object to paying more than they did in the second quarter, but a few mills intend to adhere as strictly as possible to the present spot quotation of $36. Billets, slabs and sheet bars are still rather scarce and it will be a month or more before substantial tonnages other than the regular contract allotments of non-integrated steel makers will be available in the open market. The supply of open-hearth steel is now generally adequate to meet the demands of finishing mills, but occasional closing down of open-hearth furnaces for repairs results in temporary shortages. Wire rods are active and large users have generally contracted for their third quarter requirements at the ruling quotation of $42, Pittsburgh or Cleveland.

Pig Iron.—Considerable third quarter inquiry has developed during the last week, and the volume of sales reported by local dealers has improved. The Westinghouse Electric & Mfg. Co. is reported to have closed with a Cleveland interest for the third quarter requirements of its plant in that city and it is now inquiring for an unstated tonnage for its Trafford City, Pa., works. This plant will take mostly foundry iron, with a small amount of Bessemer. The Columbia Radiator Co., McKeesport, Pa., is negotiating for about 5000 tons of foundry iron. A report that this business has been closed is unverified. On this inquiry Valley producers are actively competing with the local furnace, which has a delivered price, based on current quotations, only 13c. under the delivered Valley price. On recent miscellaneous business, however, Valley producers have shown little disposition to meet the quotations of the Neville Island furnace. Producers in the Youngstown area are fairly well sold up, and, with low yard stocks, they seem inclined to confine their activity to the immediate Valley district. The report persists that a large steel company down the river, which does not ordinarily buy pig iron, has bought 12,000 tons of basic for delivery over the next three months, but local sellers are unwilling to confirm the transaction or the price paid, which was said to have been $19, delivered by barge. On the general run of business, Valley producers seem to be adhering to current quotations of $18.50, furnace, for basic and foundry iron and $19 for malleable and Bessemer. The local furnace is quoting f.o.b. prices 50c. over these figures.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Large users are now showing interest in their third quarter requirements, and a number have covered their needs for that period at the prices which have prevailed during the current quarter. On this tonnage the ruling price is 1.95c., Pittsburgh, for bars, plates and shapes, and small users may be forced to pay a premium of $1 a ton, especially when specifications are difficult. Specifications have declined somewhat during June, notably on bars and shapes, and mill backlogs on these products have been reduced considerably in some cases. Delivery promises on bars now average about 30 days, while shipments of shapes can be made in two or three weeks. On plates, however, tonnage releases are fully equal to shipments, and deliveries range from six to eight weeks. Barge business continues active, with several small awards reported during the last week, and yards in the district are operating at close to capacity. Railroad car builders are taking steel steadily and will be busy during the entire summer. Fabricated structural steel bookings in this territory were light in the last week, but backlogs benefited by orders placed in the previous week and fabricating shops are in a better position. Reinforcing bar lettings are also rather substantial, and shipments are extended in some instances.

Bolts, Nuts and Rivets.—The end of the first half of the year finds little, if any, curtailment in the operations of bolt and nut makers, the average for the industry still holding at about 70 per cent of capacity. Railroad carbuilders are taking a large tonnage, and business from the jobbing trade is holding up well. The price situation is steady, with bolts well established at 70 per cent off list and large rivets at $3.10, base, per 100 lb., Pittsburgh or Cleveland.

Rails and Track Supplies.—Specifications have held up well during June, and although new business has dropped off considerably, this is to be expected at this time of the year. In most cases railroads have fully exercised all options to purchase materials in addition to their regular contract tonnages, and there has been a satisfactory amount of supplementary buying. Prices are well established on all products except light rails from billets, which are being shaded $2 a ton in competitive districts to meet the prices on rerolled material.

Wire Products.—Specifications are running ahead of those of May with some mills, and prospects are good for well sustained summer operations. Producers are rather surprised at the sustained demand for manufacturers' wire, which continues to be the most active of wire products in spite of curtailment in the automobile and other large consuming industries. Wire

The Iron Age Composite Prices

Finished Steel

June 25, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.341c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High			Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8	
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25	
1926	2.453c.,	Jan. 5;	2.403c.,	May 18	
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18	

Pig Iron

June 25, 1929, $18.63 a Gross Ton

One week ago	$18.63
One month ago	18.71
One year ago	17.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High			Low	
1929	$18.71,	May 14;	$18.29,	March 19	
1928	18.59,	Nov. 27;	17.04,	July 24	
1927	19.71,	Jan. 4;	17.54,	Nov. 1	
1926	21.54,	Jan. 5;	19.46,	July 13	
1925	22.50,	Jan. 13;	18.96,	July 7	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.95c. to 2.00c.
F.o.b. Cleveland	1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	9
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Bebond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard are gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

fence and other materials going largely to jobbers are moving well, and in some parts of the country there is considerable pressure for shipments. Nails are as active as could be expected, but prices are weak in some competitive districts.

Tubular Goods.—The market for line pipe is momentarily without feature, although some fairly large projects are in prospect. Oil country business continues to show improvement, and resumption of drilling operations in California fields is expected to develop some demand from that locality. Government restrictions in that area have heretofore been responsible for market dullness. Standard pipe is showing gradual improvement, but demand is not up to the average for this time of the year. Mechanical and boiler tubing continue active, with a slight falling off in the demand for the former product reported from some sources.

Sheets.—Third quarter contracts in the last week have added substantial tonnages to mill order books, and, with specifications fully equal to shipments in many cases, curtailment of operations seems just as far removed as it has been. Hot weather during the last week affected operations to a certain extent, but the leading interest ran its mills at about 93 per cent of capacity, with the independents at possibly a slightly higher rate. Specifications from the automotive industry were somewhat better, as a few companies which had curtailed schedules plan to step up production in July. No indications of lessening in the demands of other large consuming industries are noticed. Concessions from the 3.60c., Pittsburgh, price on galvanized sheets, which has been the minimum quotation to jobbers, have been reported, although a substantial part of third quarter tonnage is being placed at 3.60c. to 3.70c. On black sheets, deviations from 2.95c. are being made only in the case of very large buyers, while light plates and blue annealed sheets are becoming well established at 2.20c. and 2.35c., base Pittsburgh, respectively.

Tin Plate.—Little change in mill operations occurred during the week, with the exception of occasional curtailment on account of the hot weather. Independent companies may shut down entirely next week on account of the mid-week holiday, and not more than half a week's production is expected at any mills. This will give specifications an opportunity to accumulate and probably build up somewhat better backlogs. Tonnage releases have been rather meager since the first of the month, and, although crop reports recently have been encouraging, container manufacturers predict reduced packs in some parts of the country.

Strip Steel.—Strip steel specifications are not holding up so well as those on sheets, but are now generally heavier than they were at the beginning of the month. Makers will enter the second half of the year with little or no curtailment in operations, and current demand is proving sufficient to justify the continuance of this condition. Extended delivery promises are necessary on some of the wider sizes of hot-rolled strip, but on the narrower widths and on cold-rolled material business is getting back to the hand-to-mouth basis which ordinarily prevails. Large consumers have nearly all covered their third quarter needs at the prevailing prices.

Coke and Coal.—Slight curtailment in the demand for furnace coke is reported by some sellers, due largely to the fact that steel companies which had been buying in the open market to supplement their own production are no longer requiring additional tonnage. Operations in the Connellsville district, however, are still very high for this time of the year, with the leading interest operating more than 3000 ovens. Prices are unchanged at $2.75 to $2.85, Connellsville. Shipments of foundry coke are rather light, and prices for spot shipment are not particularly strong. Consumers of this grade are now covering their third quarter needs, and the premium brands are firm at $4.85, ovens.

Old Material.—The scrap market is dormant, with both dealers and consumers inclined to be cautious. Sales of heavy melting steel have been confined to lots of 1000 tons or less. With dealers paying $18, or a little more, for delivery to mills in this district, the market is still quotable at $18 to $18.50. The opinion persists that strictly No. 1 railroad steel or its equivalent would bring more than the top of this range. A fairly large tonnage of compressed sheets has been sold at slightly more than $18, and this grade of scrap is still quotable at last week's range. Mills in the district are growing more exacting in their requirements and rejections are reported from nearly all the principal consuming points. This condition might tend to give the market a weaker tone, but the continued high operations of mills lends support to the belief that considerable scrap will be needed next month, with the supply none too large. Bids on the Pennsylvania Railroad list will be opened on July 1. The list contains more than 40,000 tons, including about 8500 tons of heavy melting steel and 10,000 tons of car sides.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $18.50
No. 2 heavy melting steel	15.50 to 16.00
Heavy melting car sides	17.00 to 17.50
Scrap rails	17.25 to 17.75
Compressed sheet steel	17.75 to 18.25
Bundled sheets, sides and ends	16.25 to 16.75
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.00 to 18.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.00 to 21.50
Railr. coil and leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Steel Corporation Issue of New Stock All Taken

It was announced on Tuesday at the office of the United States Steel Corporation, 71 Broadway, New York, that the subscription response by stockholders in taking up the new stock issue of 1,016,605 shares at $140 had been competely successful.

Stockholders on April 16 ratified the plan of the board of directors to issue new stock in the ratio of one new share for every seven and authorized a total of 12,500,000 shares, of which 8,132,840 will presently be outstanding, an increase from 7,116,235.

The yield from the sale of the new stock will be $142,324,700, and this amount will be applied toward the retirement of $305,000,000 in 5 per cent bonds.

Plans New Rolling Mill

Charles E. Beardsley, president, Bridgeport Brass Co., Bridgeport, Conn., has announced that the company plans to build a new rolling mill to cost from $1,000,000 to $2,000,000.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$34.00 to $36.00
Rerolling, 4 in. and under 10 in., Youngstown	34.00 to 36.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	39.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$34.00 to $36.00
Youngstown	34.00 to 36.00
Cleveland	35.00 to 36.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Output Still at Near-Capacity, But Orders and Specifications are Tapering Off

CHICAGO, June 25.—Output of steel by Chicago district producers remains as near capacity as physical condition of mills will permit. The strain on equipment has been severe and temporary cuts in rolling schedules are more frequent now than at the opening of the month. Warm weather has had some bearing on open-hearth output, and has also affected some manufacturing plants, notably foundries. New buying in finished steel is in large volume, but is not equal to shipments, and mill books are growing smaller. Current specifications are lagging a trifle behind shipments and deliveries are improved, though only slightly.

Demand for plates and other car material is large. New steel orders for tanks total about 8000 tons, and inquiry is for 10,000 tons. One railroad has ordered 10,000 tons of steel for car repairs, and other sizable tonnages are before the trade. As gaged by smaller orders for steel, the automobile industry is between 15 and 20 per cent below its peak production.

The farm implement output is growing spotty, and there is additional evidence of uncertainty as to the outlook in that direction. A part of this recession is due to a seasonal decline, as shown by the fact that many farm machinery builders plan to start fall production schedules about July 1 and are now placing steel to cover needs. Probably the most pronounced cut in production is by manufacturers in the Northwest and among tractor plants as a whole.

Pig Iron.—Shipments of Northern iron so far in June are ahead of the rate in May, but in recent days deliveries have struck a slower pace. That the melt is still high is shown by the fact that a number of users already have taken a liberal part of the iron bought for delivery in July. Gray iron melters are busy, but activity in malleable foundries is spotty as a result of the lessened rate in automobile output. The stress of steady operations is telling on local furnaces, and it is highly probable that one will soon be taken out for relining. Charcoal iron is moving in carload lots at $24 a ton, furnace. Two boatloads of iron have arrived at Chicago docks this week. Since the opening of navigation eight cargoes have been received here. Third quarter buying of silvery iron is progressing more rapidly. Prices are firm. It is reported here that the new Globe furnace will produce this week.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$20.51 to 21.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Structural Material. — Following several weeks of moderately active business, this market again has become quiet. There still remains a sizable tonnage on the prospective list, but awards are few and competition is keen. Small shops are faring better in the way of new business than those of medium size. The large shops are said to be supplied with work through July. Placing of 3000 tons for a bridge at Peoria, Ill., is held in check because of the expiration of a permit issued by the Federal Government. Three Western railroads have placed a total of 700 tons of steel for bridge work.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Ferroalloys. — Several carloads of spiegeleisen have been placed at $34 a ton, Hazard, Pa. Ferromanganese is being offered at New Orleans at $105 a ton. The freight rate to Chicago is $7.56. This market remains active from the viewpoint of shipments against old commitments.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Cast Iron Pipe.—This market is dull, notwithstanding recent indications of improvement. Although there still are signs of an early betterment in business from municipalities which elected new officers this spring, there are other factors, such as the money market, unrestrained subdivision expansion last year and the swollen indebtedness of many towns and cities, that are impeding further expansion of water and gas lines. Cook County, in which Chicago is located, is seriously affected because of delay in collecting taxes while real estate is being reassessed. Carload orders, which incidentally are more numerous, constitute the bulk of going business. Shipments against old purchases are steady, with few hold-up orders reaching sellers. Prices remain firm, and deliveries are prompt for most sizes. James B. Clow & Sons and an unnamed bidder each have taken 250 tons of 6 to 12-in. pipe for Blue Island, Ill. The Blue Island Construction Co. has a general contract to lay 200 tons of pipe at Niles Center, Ill. Among new inquiries are 125 tons of 4 to 24-in. pipe for Grand Rapids, Mich., and a small tonnage for Girard, Ohio.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Semi-Finished Steel. — The local market is tight and allotments are still holding consumers below their rated capacities.

Sheets.—New buying is widespread and is fully equal to current shipments. Most new orders are for coverage during the next three months. Hot weather early last week forced curtailment of output, but the warm spell was of short duration and local mills are again producing at 85 per cent of capacity, a rate dictated by the supply of raw steel. Promises of deliveries remain unchanged, with dates further ahead on the blue annealed product. Locker manufacturers are specifying more liberally, and jobbers are finding a wide distribution for sheets. Shipments to the Southwest are in lighter volume.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies. — A Western railroad has placed a supplementary order for 3500 tons of rails, and several sizable tonnages are in the making. Pressure for rail deliveries against options, combined with the outlook for liberal purchases of additional tonnages may further postpone curtailment of rail production. One producer who a week ago looked for a reduction in output early in July now finds it highly probable that the present rate of rolling will be sustained through that month. Track fastening purchases are well up to the average of recent weeks. New business in sight is promising. A number of Western railroads are ready to enter the market for third quarter requirements. The Pennsylvania is asking for 5000 tons. Light rail business is confined to carload purchases.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands ($\frac{7}{8}$ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, $\frac{7}{16}$ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Wire Products.—This market remains steady, and output of wire mills is at 70 per cent of capacity. Current specifications from all classes of users are fully equal to shipments, and mills' stocks in most lines are stationary. Releases by the manufacturing trade are at the rate of recent weeks, except insofar as the summer lull in the automobile trade has reduced the demand for wire. No curtailment is apparent among builders of light motor cars, those in the medium-priced field being most affected. Many automobile builders expect to have new models on display about Aug. 1. Jobbers find distribution satisfactory for this time of the year. Flood waters have receded in the South, and business in that section is reported as improving. Stock turnover in the Northwest has been consistently good so far this year, and distribution is improved in the Central West. Foreign competition is moderately active along the western Gulf Coast, and particularly sharp on the Pacific Coast.

Cold-Rolled Strips. — Deliveries range from six to seven weeks, and mills are fully engaged. Forward contracting is active, but to date is not as heavy as at the approach to the second quarter.

Bars.—New business in mild steel bars is steady. Most third quarter contracts are being closed at 2.05c. a lb., Chicago. Current specifications are equal to shipments, but backlogs are smaller and promises of delivery are somewhat improved. Tractor manufacturers are taking less steel, but manufacturers of tillage machinery continue to produce at capacity. The lessened rate of automobile output is telling on production of alloy steel bars. Local mills are rearranging schedules. In the case of one producer, alloy steel bar production is at 85 per cent of capacity, but the slack has been taken up by a more active demand for special forging bars. Third quarter contracting is practically at an end. Deliveries of alloy steel bars are improved, the range now being between three and four weeks. Specifications for iron bars are steady, but new buying is quiet. Releases of rail steel bars are in good volume.

Old Material.—Heavy melting steel has declined 25c. a ton on several moderate-sized sales to local mills. The new price level does not appear to be well fixed, and the general impression is that any additional pressure for sales to consumers will develop further price weakness. In the meantime, dealers are actively covering against old contracts and are paying in some cases as high as $15 a gross ton, delivered. It is worthy of note that speculation by producers is almost wholly absent from the market. They prefer to sell scrap as it is made rather than to hold it for future sales in the hope of getting better prices. Although they are anxious to sell, they are not always willing to give attention to prompt loading. The result is that brokers are behind on many shipments, thus giving the impression to buyers that a shortage exists. Incoming shipments from rural districts are smaller, but the scrap is being more carefully graded and rejections are less numerous. Cast iron wheels are moving in small lots at $14.50 a gross ton, delivered. Lists are being offered by the St. Paul and the Burlington.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.75 to 17.25
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	18.00 to 18.50
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.75 to 18.25
Agricultural	15.75 to 16.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Plates.—Deliveries are somewhat improved, especially from mills that have fulfilled their obligations to railroad car builders. One producer will now promise shipment in six weeks. Tank makers remain busy, and the outlook for them is favorable. One user of large oil storage tanks has placed an order for 6000 tons, and a small tank maker has closed for 1200 tons. Other miscellaneous business accounts for an additional 500 tons. A Western railroad will buy 10,000 tons of car material for repairs, and smaller purchases of similar character are being made. It is stated here that the 1000 cars ordered by the Boston & Maine will be built in Western shops. A 20,000-ton pipe order has been taken by a Western maker. Fresh inquiry calls for 10,000 tons of plates for tank work.

Bolts, Nuts and Rivets.—This market remains steady, and prices are firm, as contracting for the third quarter draws to an end. Farm implement manufacturers will soon start fall production schedules, and they are making known their needs for the next three months.

Reinforcing Bars.—Pressure for delivery of reinforcing bars is putting severe stress on several Chicago shops. This situation, however, holds only where order books are large. Some shops are in need of work, and this condition is a primary factor in the unsettled price situation. A 500-ton filtration project at Cedar Rapids, Iowa, is being refigured, and bids have been extended on the 400 tons needed for the Lying-in Hospital in Chicago. A new apartment building in Chicago will require 500 tons, and the Chicago, Milwaukee, St. Paul & Pacific will need 800 tons for track elevation work. Taking this market as a whole, the outlook is more favorable except in the matter of prices.

Coke. — By-product foundry coke shipments are a trifle lighter. New buying is dull. Most users are covered for the remainder of the year. All ovens in this district are lighted.

Two More Companies Get Krupp Nirosta Licenses

Henry Disston & Sons, Inc., Philadelphia, and the Wallingford Steel Co., Wallingford, Conn., have been licensed under Krupp Nirosta patents to roll Nirosta steel into strip form, according to H. G. Batcheller, president, Krupp Nirosta Co., Watervliet, N. Y.

Other American companies operating under these patents include the Central Alloy Steel Corporation, Massillon, Ohio; Firth-Sterling Steel Co., McKeesport, Pa.; Ludlum Steel Co., Watervliet, N. Y.; Crucible Steel Co. of America, Pittsburgh; Babcock & Wilcox Tube Co., Beaver Falls, Pa.; Lukens Steel Co., Coatesville, Pa., and Spang, Chalfant & Co., Pittsburgh.

Rights to manufacture Rezistal corrosion and heat-resisting steel, the Johnson patents for which were recently acquired by the Krupp Nirosta Co. from the Crucible company, are included in the contracts with the companies named above.

Film on Alloy Steel Making

WASHINGTON, June 25.—Prepared in cooperation with one of the large alloy steel manufacturing companies, the Bureau of Mines has just released a three-reel film, "Making It Tough." The picture shows strikingly the open-hearth and electric furnace processes of making alloy steel, and its qualities are made apparent by tests to which it is put.

New York

Large Amount of Structural Steel Work in Prospect—Interest Increasing in Pig Iron for Third Quarter

NEW YORK, June 25.—More interest is being taken in third quarter pig iron requirements, although sales are still rather light, the week's total of 7500 tons being about the same as in the preceding seven-day period. Shipments are going forward to foundries at a steady rate, with almost no suspensions reported. Melt is at an exceptionally good rate among Connecticut foundries, reflecting the high rate of activity in the machine tool industry. In some cases mid-year inventories may be interfering with buying, but in general melters are cautious because no price advances appear imminent and a weakening of the market is considered a possibility. They are encouraged in this view by the aggressive policy of Southern furnaces. While little Alabama iron is reported sold, it is being actively pressed for sale, as low as $15, Birmingham, having been quoted on No. 1X. Northern brands continue to range from $17.50 to $18, Buffalo, or the equivalent, with a fair scattering of business going at the higher figure. The Eastern Malleable Iron Co. has closed for 1500 to 2000 tons for its plants at Naugatuck and New Britain, Conn. The New York Central Railroad has bought against its inquiry for 250 tons. The General Fire Extinguisher Co., Providence, R. I., is in the market for 2000 tons of foundry. The General Electric Co. inquiry for 6000 tons is still pending.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—Fresh inquiries have declined the past week, and bookings have consisted chiefly of jobs under 100 tons. Prices are steady. The Turner Construction Co. has been awarded the general contract for the automobile storage building of the New York Central Railroad at West End Avenue and Sixty-fifth Street, calling for 1400 tons of bars.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Structural steel activity continues the most prominent factor in new steel tonnage. It is estimated by one of the leading steel companies, which has just completed a survey of the country, that about 900,000 tons is in prospect for early closing. This survey covered only jobs of 1000 tons or more. Taking in the jobs under that quantity, it is estimated that the total structural work pending is well over 1,000,000 tons. A considerable portion of this prospective work is in the New York metropolitan district, but the issuance of permits has been stimulated by legislation introduced at Albany, N. Y., providing for more set-backs on buildings. This has brought a rush of building plans into the open so that permits could be obtained under the present law. Whether all of this work will go ahead is a matter of conjecture. However, not more than 150,000 to 200,000 tons of structural steel is said to be included in such projects. Awards of the past week included 3400 tons for a hotel at Sixth Avenue and Fifty-ninth Street, to be fabricated by the Harris Structural Steel Co., and 2100 tons for a telephone building on East Thirteenth Street, which went to the Taylor-Fichter Steel Construction Co. The New Jersey State Highway Commission has taken bids on 6000 tons for a bridge over the Hackensack River at Kearny, N. J. There are no special features in the demand for other steel products. Specifications against contracts continue in large volume, and additional pressure is being brought to bear by some consumers for shipments. Demand for plates has improved in the past week. Consumers are taking practically all of the unspecified balances on second quarter plate contracts.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Demand for structural material has declined slightly, but bars, plates and sheets are still active. Some shading is reported on black and galvanized sheets and occasionally on blue annealed.

Cast Iron Pipe.—Prices continue irregular, with low bids on recent projects figuring back to between $31 and $32 per ton, f.o.b. Northern foundry. On 3015 tons of 8 to 20-in. Class B pipe for Washington, on which bids were opened June 21, low bids were as follows: R. D. Wood & Co., $33.70 per net on, delivered, for the 8-in. and $34.70 per net ton, delivered, for the 12-in.; Glamorgan Pipe & Foundry Co., $34.90 per ton, delivered, for the 16 and 20-in. pipe. About 9500 tons of water pipe for the Government of the Philippines, bids on which were opened June 3, has been divided between the United States Pipe & Foundry Co., which received about 5000 tons of large sizes up to 42-in. and the American Cast Iron Pipe Co., which received 4500 tons of sizes up to 20-in.

Coke.—Although buying of furnace coke is light in this district, a fair movement of tonnage is reported to other districts, and the price is fairly firm at $2.75 to $2.85 per net ton, Connellsville. Even when contracts are offered, producers appear unwilling to shade the minimum quotation. Special brands of beehive foundry coke are $4.85 per net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is developing a slight tendency to advance on prices being paid by brokers for delivery to eastern Pennsylvania mills. Little tonnage is being obtained at less than $16 per ton, delivered, and on shipments to a Coatesville, Pa., consumer $16.25 per ton has been paid. A mill at Conshohocken, Pa., which has used mostly No. 2 heavy melting steel for a number of years, has bought a medium-sized tonnage of No. 1 heavy melting steel, and brokers are offering $16 per ton, delivered, to fill this order. No. 1 heavy breakable cast scrap is inactive, and brokers are offering $14.50 per ton, delivered eastern Pennsylvania, and $15 per ton, delivered to a Florence, N. J., consumer.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $13.35
Heavy melting steel (yard)	8.00 to 9.25
No. 1 hvy. breakable cast.	11.00 to 12.00
Stove plate (steel works).	7.75 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought....	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.25
Stove plate (foundry).....	8.25 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Truscon Operations High

Truscon Steel Co. is operating 20 per cent higher than a year ago, according to President Julius Kahn, and some departments are running on Sundays. The company is doubling the capacity of its plant at Los Angeles, adding two factory buildings, and is considering plans for additions to the Youngstown plant. It is also building a warehouse at Indianapolis, which will be part of a chain of warehouses in leading cities.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

Cleveland

Orders for Bars, Plates and Shapes Gain—June Business Shows a Decline, However

CLEVELAND, June 25.—While the volume of business in some steel products showed a further decline the past week, there was a spurt in steel bar specifications caused by liberal releases by some consumers in the automotive field and a somewhat better volume of orders for plates and structural shapes than during the previous week or two.

Consumers of steel bars, plates and shapes have specified for about all the steel covered by their second quarter contracts. Most buyers of these products have covered for the third quarter either by extending present contracts taken at the prices now prevailing or by making new contracts. Although third quarter demands are not expected to equal those of the present quarter, most consumers have contracted for the same tonnage as during the second quarter.

June will show considerable decline in business, as compared with May, the decrease being largely due to the slowing down of the automotive industry. Some further curtailments are reported in this field.

With reduced summer operations and the bringing out of new cars, motor car manufacturers and body builders are not ordering steel as far ahead as during the spring and are keeping their stocks lower. Operations of some auto parts makers have slowed down, but there are few reports of suspensions of steel shipments. Deliveries on steel bars as yet show very little improvement, but sheet and hot and cold-rolled strip mills are catching up on deliveries. Mills will start the last half with good backlogs of orders that will keep them in full operation on most products through July or longer.

Inquiry in the structural field continues rather light. Foundations for the Ohio Savings & Loan Building, Toledo, will require 400 tons of sheet steel piling.

No deviation is reported from the regular prices of 1.95c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and structural material.

Pig Iron.—Sales fell off the past week, during which Cleveland interests booked 17,000 tons in foundry and malleable iron, largely for the third quarter. There was a little more activity in orders from the automotive industry than has heretofore been shown, although there is still an absence of general interest in third quarter contracts. The market in Cleveland is inactive following a recent spurt of buying by local foundries. Southern foundry iron, at its present low price, is to some extent cutting into sales of the Northern grades at points in southern Ohio and southern Indiana, where its delivered price is lower than on northern Ohio iron. However, Southern iron is not regarded as a serious competitor, as many foundries do not care to use it because of its high phosphorus content or will use it only as a mixture with Northern iron. An Ohio foundry is inquiring for 4000 tons of foundry iron for the last half and the same amount for the first quarter of next year, but furnaces will not quote for delivery beyond Jan. 1. The Westinghouse Electric & Mfg. Co. has an inquiry out for iron for its Trafford City, Pa., plant. This company has not yet purchased the iron for its Cleveland plant, for which it recently inquired, and the inquiry from the General Electric Co. for 1200 tons for its Erie works is still pending. Quite a few northern Ohio foundries have enough iron due on second quarter contracts to carry them into July. Ohio jobbing foundries continue in good operation. Ohio foundries during May operated at 114.5 per cent capacity, as compared with 113.1 per cent in April, according to the monthly report of the Ohio Foundries Association, Inc. Prices are unchanged at $18.50, Cleveland, for foundry and malleable iron for outside shipment and $19 for local delivery. Lake furnaces quote both grades for Michigan shipment at $20. Shipping orders have fallen off owing to the slowing down of the automotive industry. Some furnaces will ship about 10 per cent less iron this month than in May.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$21.00 to 21.50
Malleable	19.50
Ohio silvery, 8 per cent...	29.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The consumption of Lake Superior ore in May amounted to 6,002,193 tons, breaking all previous records excepting May, 1923, when the consumption amounted to slightly more than 6,100,000 tons. There was an increase in May of 584,702 tons over April. The amount consumed in May, 1928, was 4,947,768 tons. The amount of ore on hand at furnaces June 1 was 15,274,683 tons, and the amount at furnaces and on docks on the same date was 19,145,874 tons, as compared with 18,876,721 tons on June 1, 1928. Furnaces in the Central district consumed 3,031,970 tons of ore in May, an increase of 225,675 tons over April; Lake front furnaces used 2,704,274 tons, a gain of 299,824 tons; all rail furnaces consumed 161,238 tons, an increase of 44,479 tons, and Eastern furnaces melted 104,711 tons, a gain of 14,724 tons. There were 190 furnaces in blast using Lake ore May

31, an increase of six for the month. Ore continues to move down the Lakes at a heavy rate, and it is expected that water shipments during June will total 10,000,000 tons.

Semi-Finished Steel.—A number of contracts for the third quarter have been taken by a local mill at $35 for sheet bars, billets and slabs, that price being quoted with a Cleveland, Youngstown and Valley base. The same price is being named in the Youngstown district. This is an advance of $1 a ton on billets and slabs, but the same price has prevailed during the last quarter on sheet bars, mills having abandoned an attempt to advance the latter $1 a ton. The supply is decidedly easier. One Valley mill which did not produce enough for its own requirements during the present quarter has some to sell for the third quarter.

Sheets.—Orders from the automotive industry have further declined, and some mills now are not entering as much tonnage as they are shipping. Good specifications for black sheets came out during the week from some of the barrel manufacturers which recently had been holding back on orders because of a slowing down in their business. Hot weather has resulted in some decrease in sheet production. Large consumers in the automotive field are showing less concern about deliveries than recently, and some have made a 50 per cent reduction of their tonnage on order and in stock. Most mills are filled up with auto body sheets through July. Concessions to 2.85c., Pittsburgh, on black sheets seem to have become more common. On galvanized, 3.60c., Pittsburgh, is rather general. Similar concessions are being made by some mills by adhering to the regular base price, but naming a Valley basing point.

Strip Steel.—The demand for both hot and cold-rolled strip shows an easing off, and shipments are in excess of incoming orders, which has resulted in a further improvement in deliveries. Several mills can now make shipments of hot-rolled strip in two to three weeks. On cold-rolled material, deliveries can be secured in three weeks. There has been a moderate amount of contracting for the third quarter. The market is firm at the regularly quoted prices.

Wire Products.—Mills having regular priced contracts for wire report an improvement in specifications, indicating that some of the outstanding 2.40c. contracts have been cleaned up. Good specifications are coming from the bolt and nut industry. Leading producers are adhering to $2.65 a keg for nails, although some buyers have contracts at lower prices.

Warehouse Business.—New extras on blue annealed sheets have been adopted by local jobbers, effective July 1, to take the place of the double base method of quoting recently adopted by the mills. The present No. 10 base and 3.25c. base price will be retained. Other gages will cost as follows: No. 12, 3.35c.; No. 14, 3.45c.; No. 16, 3.55c.; No. 8, 3.20c.

Coke.—Ohio by-product foundry coke has been reaffirmed at $8.25, Painesville, for July shipment. There has been a slight curtailment in the demand. Little new business is coming out in Connellsville foundry coke. Prices on the better grades are firm.

Old Material.—A Valley mill has purchased some heavy melting steel at $18, and dealers are paying $17.50 for material to ship against this contract. For delivery to a Cleveland mill, dealers are paying $17.50 for selected No. 1 heavy melting steel scrap. Another local mill that for some time has been restricting shipments of steel making scrap has made a further reduction of 50 per cent in its releases, evidently because of heavy shipments by water from Detroit. Mills are not holding up shipments of blast furnace scrap, and there is some activity in these grades among dealers who find that little can be bought below $11. In spite of limited activity, the market generally appears fairly firm at recent quotations.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos. plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	17.25 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Southern Pig Iron Competition More Active—New Rail-Water Rate Via Savannah Granted

PHILADELPHIA, June 25.—Mill operations are well sustained, except for a slight temporary recession in some instances because of the extremely warm weather and some curtailment of open-hearth operations for repairs to furnaces. With automobile manufacturers becoming less active, there is a slight easing of operating rates at sheet mills, and this decline in activity is reflected in the increased willingness of some sheet producers to shade black and galvanized sheet prices $1 and $2 a ton.

The Pennsylvania Railroad has not yet inquired for third quarter requirements of plates, shapes and bars, but opens bids July 5 on 300 tons of blue annealed, 200 tons of black and 100 tons of galvanized sheets, 340 tons of plain and galvanized steel pipe, 300,000 tie plates and 10,500 kegs of spikes.

Pig Iron.—Small tonnages of foundry iron have been closed for third quarter delivery and in certain instances the business has been taken by Southern sellers, who are understood to have quoted as low as $14.50 per ton, Birmingham, plus a rail and water rate, via Norfolk, Va., of $4.77½ per ton, alongside dock, Philadelphia, for barge cargoes of 700 tons or more. In one recent instance, the price for a small tonnage of foundry iron was $21.35½ per ton, delivered Manheim, Pa., based on $15, Birmingham, with a freight rate of $6.35½. Lower rail and water rates from Birmingham via Savannah on the Merchants & Miners and Ocean Steamship lines have been granted, effective Aug. 10. The schedule calls for $5.25 to Philadelphia, $5 to Baltimore, $5.50 to New York and $5.75 to Boston, loaded on cars at the port, no minimum tonnage specified. Recent offers of Birmingham basic iron have been at $13.50 per ton, furnace, which, with the present rail and water freight rates, represents a saving to consumers in eastern Pennsylvania of $1.50 a ton or more. One offer of Southern basic was of iron ranging from 0.70 to 0.80 per cent phosphorus and 0.50 per cent manganese. Except for recent trial shipments, no tonnages of Birmingham basic have been closed, but some small purchasing is expected soon. Eastern Pennsylvania furnaces have

in some instances met the competition of Birmingham foundry iron by shading $21.50 per ton, furnace, by about 50c. a ton, but no recession has been made in the price of basic, which is still maintained at $20.50 per ton, furnace. Appearance of a sizable tonnage of basic, however, will provide a test of its firmness in competition with Southern iron. The Virginia furnace, which has been out of blast since last September, is preparing to blow in early in October, after improvements to reduce cost of production.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Mills are well engaged and still shipping heavily against contracts. Some contracts have been closed for third quarter at 1.95c., Pittsburgh, or 2.27c. per lb., delivered Philadelphia.

Reinforcing Bars.—Tonnages continue small. Prices on both billet steel and rail steel bars are unchanged. Billet steel bar prices range from 1.90c. to 1.95c., Pittsburgh, quoted by eastern Pennsylvania makers, to 2c. and 2.05c., Pittsburgh, quoted by Pittsburgh mills. Billet steel bars are 2.22c. to 2.37c. a lb., delivered Philadelphia, with $5 extra for cutting to length. Rail steel bars are about 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Although mills are operating at a good rate and have a substantial tonnage ahead of them, prices are still irregular. Most small orders are placed at 2c., f.o.b. nearest mill to consumer, or 2.06c., Philadelphia, and occasionally 2.05c., f.o.b. mill, or 2.11c., delivered Philadelphia, while the more desirable tonnages bring out 1.95c., f.o.b. mill, or 2.01c., delivered Philadelphia. The larger fabricators are well engaged on recent awards of large projects, but the smaller shops, which depend upon the lesser projects, are in some instances in need of orders.

Plates.—Deliveries still range from four and five weeks, and producers are well booked ahead. Some third quarter contracts are being closed at 2.05c., Coatesville, or 2.15c., delivered Philadelphia. Railroad car builders and the railroads are providing some good business. Heavy buying by ship builders is still in prospect.

Sheets.—Blue annealed sheet prices are 2.25c. to 2.35c. a lb., Pittsburgh, for No. 13 gage, or 2.57c. to 2.67c., delivered Philadelphia, and light plates, blue annealed, are quoted at 2.10c. to 2.20c., Pittsburgh, for No. 10 gage, or 2.42c. to 2.52c., delivered Philadelphia. The large preferred buyers occasionally receive concessions from these prices of about $1 a ton. Black and galvanized sheets are subject to concessions of $1 to $2 a ton on black and usually about $2 a ton on galvanized, so that black sheets are quotable at 2.85c. to 2.95c., Pittsburgh, or 3.17c. to 3.27c., delivered Philadelphia, and galvanized at 3.60c. to 3.70c., Pittsburgh, or 3.92c. to 4.02c., delivered Philadelphia. Buying by automobile body builders has declined.

Imports.—In the week ended June 22, 1501 tons of pig iron arrived at this port, of which 1297 tons was from British India and 204 tons from Norway. Manganese ore imports consisted of 500 tons from Java. Steel arrivals were largely from Sweden, which furnished 25 tons of iron bars, 43 tons of steel bars, 42 tons of steel billets and six tons of iron sheets. A total of 111 tons of structural shapes and 17 tons of steel scrap were received from Germany, and three tons of steel scrap came from the United Kingdom.

Old Material.—The only scrap transaction of consequence in the past week was the purchase of 3000 to 4000 tons of No. 1 heavy melting steel at $16.50 per ton, delivered, by a Conshohocken, Pa., consumer, which usually buys No. 2 heavy melting steel. The contract is understood to have been for the purpose of replacing a stock of No. 1 steel recently depleted, which is usually kept on the yard for emergency. Other grades of scrap are moderately active, with dealers completing contracts.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	$12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50
Shafting	19.50 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.00 to 16.50
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

The Surface Combustion Co., Toledo, Ohio, has opened a district sales office at Kansas City, Mo., which will serve Kansas, Nebraska, Wyoming, Colorado, Utah, Missouri, with the exception of St. Louis, and a portion of Texas.

Peak Output of Commercial Steel Castings

WASHINGTON, June 25.—Production of commercial steel castings in May, 127,079 net tons, was the highest ever recorded since the beginning of 1926, when these data were first gathered. It displaced the previous record, that of April, when 121,941 tons was produced. Operation was at 87 per cent of capacity in May, against 84 per cent in April. Last year May showed 93,333 tons, or 63 per cent of capacity.

It was in railroad specialties that the new record was made. That division of the industry accounted for 58,636 tons, a gain of nearly 10 per cent on the April total of 53,458 tons, which was the previous high mark. Miscellaneous castings totaled 68,443 tons, only 40 tons below the record, made in April, of 68,483 tons.

For five months, production has been 27 per cent above 1928, with 555,164 tons, against 435,519 tons. The previous record for a similar period was in 1926, with 503,144 tons. Both divisions of the industry were far ahead of last year—railroad specialties with 237,627 tons, against 174,099 tons; miscellaneous castings, with 317,537 tons, against 261,420 tons.

New orders fell off in May from the high level established in April, only 113,219 tons being ordered against 144,616 tons—the highest in several years. But the five-month total was far above last year, with 628,623 tons, against 437,161 tons. The gain was 44 per cent.

Orders for railroad specialties, at 44,919 tons in May, were the lowest since December. The April total was 75,625 tons—a record for post-war years, and representing 112 per cent of capacity. Miscellaneous castings, 68,300 tons in May, were only 1 per cent below April's 68,991 tons, and 2½ per cent below the 70,093 tons of March.

Compared with last year, the five-month railroad orders advanced 123,830 tons and the miscellaneous orders, 67,632 tons. Railroad orders reached 304,999 tons; miscellaneous, 323,624 tons.

Eighty-five new members were added to the roll of the Institute of Scrap Iron and Steel, Inc., as the result of a membership campaign conducted in connection with the Federal Trade Commission conference held in Pittsburgh last month. The total membership of the institute now consists of 400 scrap iron firms, representing more than 90 per cent of the tonnage shipped by dealers.

Mead-Penn Iron Works Co., Meadville, Pa., through its subsidiary, the Cooling Engineering Co., has closed a contract with Carnegie Steel Co. for a water cooling and purifying plant. About 400 tons of plates and shapes will be required.

Pacific Coast

Oil Tanks and Buildings Create Increased Demand for Plates and Shapes—Steel Price Structure Firm

SAN FRANCISCO, June 22.—(*By Air Mail.*)—Increased demand for iron and steel products this week features the Coast markets. Some large tonnages have been placed. Considerable interest has been displayed recently in oil storage tanks, and one company has placed six 118,000-bbl. tanks calling for 2500 tons of plates and shapes. A contract for an office building in Los Angeles will require 3000 tons of shapes, and one in San Francisco involves 1000 tons. A fair volume of pending business is up for figures, including 5000 tons of shapes for an office building in San Francisco, 1400 tons of cast iron pipe for Los Angeles and 3200 tons of plates and shapes for eight large oil storage tanks. The price structure is on a firmer basis than at any time this year; practically no shading has been reported.

Pig Iron.—Little of importance transpired this week in the pig iron market, sales and inquiries involving unimportant tonnages for immediate shipment. Imports of pig iron in March were about 50 per cent below the total for March, 1928.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Demand for reinforcing steel bars has improved somewhat, and awards this week were the largest in nearly a month. The Pacific Coast Steel Co. booked 500 tons for a power plant at Renton, Wash., and 200 tons for a school and a warehouse in Seattle. The Truscon Steel Co. secured 150 tons for a mausoleum at Hayward, Cal. Pending business exceeds 6000 tons, and includes 300 tons for an office building at Seattle and 416 tons for a bridge in Monterey County, Cal. Prices on out-of-stock material in the San Francisco district continue at 2.20c., base, on lots of 250 tons and up, 2.30c., base, on carload quantities, and 2.60c. on smaller lots. Merchant bar prices continue unchanged at 2.35c., c.i.f. Movement of this class of material continues limited to small tonnages. Importations of bars in March were the smallest in over two years, having totaled less than 200 tons.

Plates.—The most important plate project of the week went to the Lacy Mfg. Co. and called for 2500 tons of plates and shapes for six 118,000-bbl. tanks for the Texas Oil Co., Los Angeles. This company has an inquiry out for eight additional tanks of the same size, involving 3200 tons. The East Bay Municipal Utility District, Oakland, Cal., will open bids on July 10 for 100 tons of 54-in. riveted pipe. Pasadena, Cal., voted bonds for the San Gabriel dam project involving more than 9000 tons of plates for a 60-in. line. Prices are firmer now than they have been at any time this year and no shading has been reported. Quotations continue at 2.35c., c.i.f. Coast ports.

Shapes.—Structural projects placed and pending call for a rather heavy tonnage. The Consolidated Steel Corporation took 3000 tons for the South California Edison Building, Los Angeles, and 140 tons for two ferry bridges in San Diego. The Judson-Pacific Co. secured the Metropolitan Life Insurance Building addition in San Francisco, which will require 980 tons. The McClintic-Marshall Co. was low bidder on 600 tons for an exhibit building at Pomona, Cal. Bids were opened this week on 4200 tons for the Shell Oil Co. Building, San Francisco, and on 1000 tons for an apartment house on O'Farrel Street, San Francisco. Importations in March fell off considerably from the aggregate brought in a year ago. In March, 1928, more than 4300 tons was imported, compared with less than 700 tons for the same month this year. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—The tonnage placed this week was the largest in over two months, exceeding 4000 tons. The only large lot called for 4200 tons for Los Angeles and was placed as follows: American Cast Iron Pipe Co., 2239 tons of 8 to 12-in. Class B pipe; the McWane Cast Iron Pipe Co., 1249 tons of 6-in. Class B, and the National Cast Iron Pipe Co., 713 tons of 8-in. Class B. Los Angeles will open bids on June 25 for 1148 tons of 24-in. Class C pipe and on 1425 tons of 8-in. Class B pipe. Long Beach, Cal., opened bids on 217 tons of 6 to 12-in. Class B pipe. The East Bay Municipal Utility District will open bids on July 10 for 2331 tons of 6 to 20-in. Class B or centrifugal pipe. Importations of cast iron pipe in March fell off from the total imported during the preceding month, but were on a par with the total for March, 1928. The figures follow: March, 1929, 2518 tons; February, 1929, 3687 tons; March, 1928, 2522 tons.

Steel Pipe.—The Pacific Gas & Electric Co. has not yet placed 2263 tons of 8⅝-in. O. D. pipe for installation in Gilroy, Monterey and Salinas. No other large inquiries for line or gas pipe have been reported. Los Angeles will open bids next week on 225 tons of ¾-in. to 2-in. galvanized standard pipe. Importations of tubular products in March were larger than the preceding month's total.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Reduced to $15 to District Consumers for Third Quarter—Steel Ordering Tapers Off Slightly

BIRMINGHAM, June 25.—Furnaces have opened books for third quarter pig iron at $15, base Birmingham, a reduction of 50c. a ton on prices in this district. This is the lowest price for Birmingham iron in seven years. Several round tonnages have been booked at the new price, but the buying movement is not marked and the aggregate of third quarter iron sold so far is unsatisfactory to furnace interests. Indications are that the buying will be conservative. Shipments are moving steadily, but stocks on furnace yards show little change. The No. 2 Woodward furnace of the Woodward Iron Co. was changed from foundry to basic iron on June 17. Of the 17 furnaces in operation, nine are on foundry, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.00
No. 1 fdy., 2.25 to 2.75 sil.	15.50
Basic	15.00

Finished Steel.—A moderate drop in new business is attributed to the seasonal let-up, which is developing about two months later than usual. Bars, structural shapes and wire products are among the more important lines to show a decrease in orders from the high weekly average of the past several months. Aside from a little tapering off in orders, there is no noticeable change in the market. Specifications on old orders are still good. All finished steel prices are the same. Structural steel fabricating shops are running substantially full and have large backlogs. The Nashville Bridge Co. has received an order for 400 tons for a sub-station for the Georgia Power Co. The Tennessee company is operating eight open-hearths at Ensley and eight at Fairfield, and the Gulf States Steel Co. is operating six at Alabama City.

Cast Iron Pipe.—Important tonnages have been lacking in the pressure pipe market. Though small order business has been fair, the aggregate is not sufficient to maintain backlogs. The Philippine project, for which bids were opened early in the month, is still pending; about 10,000 tons will

SIDE GUIDE & GRIPPER

be required. The date for opening bids for the Houston, Miss., project has been changed from June 18 to July 5. This will require 15,540 ft. of 6-in. and 5300 ft. of 8-in. pipe. The United States Pipe & Foundry Co. has booked an order from Macon, Ga., for about 300 tons. June shipments have been active, and reductions in stocks are reported in some instances. The base prices of $37 and $38 continue.

Coke.—Second half contracting is about over. Prices remain at $5.

Old Material.—The market is more depressed than last week, and slight price revisions are expected by the end of the month unless there is improvement in the meantime. Dealers are taking practically no material, as present stocks are more than ample for consumers' demands.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	13.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	13.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	14.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

St. Louis

Spurt in Pig Iron Buying for Third Quarter—Settlement of Building Strike Releases Steel Tonnages

ST. LOUIS, June 25.—After weeks of dullness, buying of pig iron took on a spurt during the last week, sales of the St. Louis Gas & Coke Corporation totaling 28,000 tons. The principal sales were 18,000 tons of basic to one East Side melter and 5000 tons of basic to another. Of the 5000 tons of foundry grades sold, 2500 tons went to an Iowa manufacturer serving the implement trade; 1000 tons to an Indiana melter, and 1000 tons to a St. Louis machinery manufacturer, and the remainder in scattered lots. All of this was for third quarter delivery. Now that the proposed Southern freight rate reduction has been suspended, it is expected that other melters will come into the market for their third quarter requirements. Some Southern iron also was sold. Shipments of the Granite City maker averaged 1162 tons daily for the first 20 days of June, compared with 1120 tons for the same period in May, which was the second largest month for shipments in the history of the company. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd.	$19.42 to 19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Structural Steel.—Seven hundred union workers, who have been on strike since May 1, have agreed to return to work at a wage of $13 a day, an increase of $1. The new scale is effective until May 1, 1930, when a $14 a day rate will be paid for an additional year. Union building laborers and stone cutters, who went on strike at the same time, had previously returned to work. Many projects have been tied up as a result of the strike. Structural steel fabricators expect a number of jobs which have been held up on account of the strike to go ahead now.

Finished Iron and Steel.—The Granite City Steel Co. reports that galvanized sheets are moving in good volume and slightly better than a few weeks ago. Incoming business in black sheets is somewhat in excess of the mills' capacity, while the demand for blue annealed sheets and blue annealed light plates is exceptionally heavy, making prompt deliveries impossible. Specifications for tin plate are increasing. Demand for plates also is good. Railroads have issued inquiries for second half requirements, the Wabash, Missouri-Kansas-Texas and Missouri Pacific for plates, shapes and bars and the Wabash and Cotton Belt for track spikes and bolts. The Wabash also has inquired for prices on tank plates, boiler plate and firebox plate required for 25 Mikado type locomotives, the material to be shipped to the locomotive manufacturers.

Coke.—Dealers are beginning to lay in stocks of domestic grades of coke, although the movement is light. Furnace coke continues in good demand, and there is reported to be a shortage of foundry grades.

Old Material.—Buying of old material was confined almost entirely during the week to one mill, which bought considerable No. 1 heavy melting steel, as much, in fact, as the dealers would sell at the present market price. Shipments from the country are light, and there were only two railroad lists: Frisco Lines, 1000 tons, and Chicago, Burlington & Quincy, 4075 tons. Prices generally are unchanged.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Canada

Steel Backlogs Heavy; Orders Satisfactory

TORONTO, ONT., June 25.—Business is holding at a satisfactory level. Mills are well booked, and backlogs assure near-capacity operations for several months to come. Railroad purchases of rolling stock and track equipment are expected to develop within the next month or two in substantial volume.

Pig Iron.—While forward delivery contracting has not reached large proportions, such business is steadily improving. Several new contracts covering the next three months were closed during the week. These swelled the volume of unfilled orders on the books of producers. Inquiry is active. Spot buying in small lots is steady. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.10 to $24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10 to 24.60
Malleable	24.10 to 24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.50 to $26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	25.50 to 26.00
Basic	24.50 to 25.00
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Several orders in prospect for early closing will involve 5000 tons or more each. Fabricators of structural steel report large unfilled orders on hand, some of them being booked almost solid for the remainder of the year.

Old Material.—Forward delivery buying has been at a standstill for

the past two or three weeks, but several inquiries which appeared during the week indicate that a few of the larger consumers are preparing to place contracts for third quarter delivery. The spot demand is in good total volume, but confined to small individual orders. Mills are not buying at the moment, with the result that steel scrap is slow in the Toronto and Hamilton districts. Dealers report no change in the price situation.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

New Ball Bearings Company

The Self-Aligning Bearings Co., Inc., has been organized by S. Fabian Goodman, 1834 Broadway, New York, who has long been connected with the ball bearings industry, at one time with the Hess-Bright Mfg. Co., Philadelphia. The new company has equipped a plant at Paynter and Ely Avenues, Long Island City, N. Y., having purchased about $70,000 worth of new machine tools for the purpose. At the beginning only about 15 of the most popular sizes of self-aligning ball bearings will be manufactured.

Mr. Goodman, who is also president of the Bearings Industry Corporation, heads the new company. Harold Zeaman is secretary and Edmund Joseph is treasurer.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Boston

Pig Iron Price Situation May Be Clarified by Closing of Pending Tonnages—Scrap Steady

BOSTON, June 25.—A few sales of Buffalo foundry iron are reported at $17.50, base, but $18 is said to be the usual quotation. Some Buffalo producers are still holding to $18.50, base. It is expected that the Buffalo price situation will be clarified this week with the closing of several thousand tons of pending business, which includes 2000 tons of No. 2 X and No. 1 X, wanted by a Providence R. I., melter, 2000 tons of three grades sought by a central Massachusetts melter and some smaller tonnages inquired for by other consumers. Sales in the week were about 6000 tons.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.41 to $23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.91
East. Penn., sil. 1.75 to 2.25	24.65
East. Penn., sil. 2.25 to 2.75	25.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.91 to 23.77
Ala., sil. 2.25 to 2.75	22.41 to 24.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Reinforcing Bars.—Three or four pending jobs to be closed soon total about 400 to 500 tons. The largest of these is 250 tons for the North Station, Boston. A tunnel job between Boston and East Boston that will call for several thousand tons apparently is a long way off. Most bookings the past week were in 10 and 20-ton lots, with 2.66½c. per lb., base, from stock, the prevailing price. Rail steel bar business is slow in developing. Current bookings are negligible on an openly quoted basis of 2.26½c. per lb., delivered common Boston freight rate points.

Coke.—New England consumption of by-product foundry coke is holding up well, although one company reports a slackening in specifications.

Old Material.—Price changes on scrap have been very few within the past week. The amounts offered by several of the leading brokers are virtually identical on some grades of scrap. An exception is steel axles, on which prices ranging from $17 to $18.50 have been paid. No. 1 heavy melting steel of good quality is not plentiful. Pending the arrival of boats for loading, the export scrap market is quiet. It is announced that the Japanese steamer Yaye Maru has been chartered to load scrap at Houston, Tex., for shipment to Rotterdam. The injection of Rotterdam into the export scrap market is a new development.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.25
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.60
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.25
Forge flashings	9.50 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.00 to 10.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

Cincinnati

Sheet Production Exceeds Bookings and Backlogs Are Being Reduced—Pig Iron Buying Light

CINCINNATI, June 25.—Aside from a sale of 3600 tons of Northern foundry to an Ohio melter, pig iron buying has been confined to small lots for third quarter delivery. Foundries are taking shipments on current contracts at a normal rate, and operations among jobbing foundries are especially good. There are no large inquiries before the trade, and indications are that bookings will continue light in the immediate future. Although Northern iron appears firm at about $18.50, furnace, Alabama and Tennessee iron is weak at $15, Birmingham. A large Alabama producer, which has been consistently maintaining its schedule at $15.50 in recent weeks, has announced a drop of 50c. a ton to $15, the price quoted by the majority of Southern makers.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Fresh bookings of district sheet mills have failed to keep pace with production, and consequently backlogs have declined for the second consecutive week. Sales of specialty grades of sheets, particularly to manufacturers of electrical equipment and of metal furniture,

have been of substantial volume, but curtailment of buying on the part of automobile makers has reduced the size of backlogs.

Coke.—By-product foundry coke will remain unchanged at $10.05, delivered Cincinnati, during July. Specifications and orders have been fair, although somewhat less than in May.

Old Material.—The market continues firm. Dealers are having difficulty in obtaining good scrap to fill current contracts, and this condition gives an underlying tone of steadiness to prices. Scrap users are buying sparingly and are confining orders to immediate requirements.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Detroit Scrap Market Fairly Steady

DETROIT, June 25.—The general tone of the market on old material in the district is fairly firm. Long turnings are 50c. a ton higher, due to the fact that a large steel interest which heretofore has not been a user of this grade has come into the market for a substantial tonnage. No. 1 machinery cast and stove plate have declined 50c. a ton.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	9.00 to 9.50
Long turnings	7.50 to 8.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.50 to 14.00
Stove plate	9.00 to 9.50
New No. 1 busheling	12.00 to 12.50
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.50 to 9.00
Flashings	12.50 to 13.00

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Buffalo

Pig Iron Inquiry Increasing—Steel Mill Operations Still High—Heavy Melting Scrap Bought at $17.25

BUFFALO, June 25.—There has been quite a little more inquiry for pig iron in the past week, and several good-sized tonnages are now pending. So far as can be learned, the General Electric Co. inquiry for 6000 tons of foundry and malleable for its various plants has not yet been placed. A State melter is inquiring for 2000 tons of foundry, and another inquiry originating in New England is for 2000 tons of foundry. Still another melter wants 1500 tons, and there are several inquiries out for 500 to 1000 tons each. Prices in the district are holding at $19.50, base, for No. 2 plain, but in some cases in the East $18, base, has been done. The quotations which appear below are those applying on sales to consumers within the immediate Buffalo district. Lower prices are quoted for delivery to New England and other sections which take a freight rate of $3.28 a ton or more.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 3.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations of all the Buffalo mills are being maintained at the high rate of the past several months. No sign of tapering is visible.

Old Material.—The only transaction of consequence during the past week was the purchase of about 2000 tons of No. 1 heavy melting steel at $17.25. This grade of material seems to be very firm at $17.25, and it was with some difficulty that the above-mentioned order was covered at this price. Dealers are offering $17 on old orders, but are picking up the material slowly.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.00 to $17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Exports Down, Imports Up, in May

WASHINGTON, June 25.—Exports of iron and steel from the United States in May totaled 261,516 gross tons, a decline of 16,064 tons under April. Imports, on the other hand, rose to 74,272 tons, an increase of 19,935 tons over April, and the highest for any month of the current year. Increased incoming shipments are ascribed to anticipated higher tariff duties.

Exports for the first five months of 1929 aggregated 1,344,028 tons, against 1,096,595 tons for the corresponding period of last year. Among the principal declines in May exports under those of April were tin plate, rails and steel bars. Substantial gains were made in exports of scrap, plain shapes and skelp, the increase in scrap amounting to 13,304 tons, being the greatest.

Total imports for the first five months were 294,210 tons, a decrease of 33,276 tons from the corresponding period of last year. The principal gains in May imports over those of April were in pig iron, which gained 7700 tons; cast iron pipe, 5129 tons; shapes, 2440 tons, and hoops and strips, 2375 tons.

New Mixer of 1500 Tons

The Pennsylvania Engineering Works, New Castle, Pa., has taken a contract from the Carnegie Steel Co., Mingo Junction works, for the design and construction of a 1500-ton hot-metal mixer. This will be one of the largest mixers ever constructed, and will be the company's third installation for the Carnegie Steel Co., two mixers of this same size having been installed at the Ohio works, Youngstown.

Huge Production of Motor Cars Continues

WASHINGTON, June 21.—Motor vehicles to the number of 603,969 were produced in the United States in May, according to the Department of Commerce. This output reflected a decline of 17,362 units from April, the record month, with an output of 621,331. Passenger car production in May was 516,055, against 537,225 in April, while the truck production of 86,596 in May established a record, exceeding that of 82,420 units in April by 4176. Taxicab production in May was 1318, against 1686 in April.

Motor vehicle production in the United States during the first five months was 2,677,781 units, a new record, against 1,804,725 for the corresponding period of last year. Passenger car output was 2,319,639 and 1,606,602, respectively, while truck production was 348,890 and 195,367, respectively.

Canadian motor vehicle production in May was 31,559, against 41,901 in April.

Gain in River Movement of Steel in 1928

Total freight moved on the Ohio River in 1928 amounted to 20,938,267 tons, an increase of more than 800,000 tons, or 4 per cent, over 20,128,518 tons transported in 1927, according to the United States Division Engineer, Central Division, Cincinnati. Omitting sand and gravel, the 1928 movement totaled 12,189,034 tons, an increase of 11.4 per cent over the 10,941,511 tons moved in 1927. The average haul for this tonnage increased from 98.3 miles in 1927 to 100 miles in 1928.

The increase in tonnage and ton-mileage was mainly in iron and steel, coal, petroleum products and packet boat freight. The tonnage of iron and steel increased from 1,039,821 in 1927 to 1,413,216 in 1928, and the ton-mileage from 294,390,000 to 350,556,663; the tonnage of coal increased from 8,517,714 to 9,160,766, and the ton-mileage from 682,993,438 to 710,122,972. The amount of steel moving from the upper Ohio to the Mississippi increased from 250,000 tons in 1927 to 275,000 tons in 1928, while there was also a very large increase in the local movement in the vicinity of Pittsburgh and as far down as Mingo, Ohio, a distance of 71 miles.

Coal constituted 43.8 per cent of the total tonnage moved on the river last year; sand and gravel, 41.8 per cent; iron and steel, 6.75 per cent; stone, 2 per cent; logs and lumber, 1.9 per cent; oil and gasoline, 1.6 per cent, and packet freight, 1.6 per cent. Measured in ton-miles, coal ranked first with 52 per cent of the total, and iron and steel second, with 26 per cent of the total.

Austrian Steel Production Increased Last Year

WASHINGTON, June 18.—Austrian pig iron production in 1928 totaled 457,911 metric tons, compared with 435,404 tons in 1927; steel ingot output increased to 635,657 tons from 551,216 tons, and semi-finished steel output was 480,989 tons as compared with 405,177 tons, according to a report received from John P. Hurley, American consul at Vienna.

At the end of 1928 blast furnaces were operating at about 78 per cent of capacity, steel works at 97 per cent and rolling mills at 93 per cent. Exports of all classes of iron and steel in 1928 declined to 170,231 tons from 201,063 tons. Forty per cent of the 1928 foreign shipments went to Czechoslovakia and 50 per cent to Italy, Hungary, Germany and Jugoslavia. Imports in the first nine months amounted to 67,084 tons, compared with 52,973 in the corresponding period of 1927.

Fabricated Steel Plate Orders Higher

WASHINGTON, June 24.—Orders for fabricated steel plate in May totaled 47,108 tons, according to reports received by the Department of Commerce from 48 firms, and represented 59 per cent of capacity. This compares with 40,675 tons and 50.9 per cent in April and with 42,487 tons and 53.2 per cent a year ago. May orders were distributed as follows: Oil-storage tanks, 10,087 tons; refinery materials and equipment, 4053 tons; tank cars, 960 tons; gas holders, 5300 tons; blast furnaces, 1245 tons; stacks and miscellaneous, 25,463 tons, the largest in many months.

Orders for the first five months aggregated 237,041 tons, or 59.3 per cent of capacity, against 225,281 tons, or 56.4 per cent of capacity, for the corresponding period of last year. There was a sharp reduction in oil-storage tanks, which dropped from 98,806 tons to 69,264 tons. All other outlets showed increases: Refinery materials and equipment, from 13,805 tons to 24,434 tons; tank cars, from 11,198 tons to 22,833 tons; gas holders, from 17,036 tons to 21,813 tons; blast furnaces, from 2888 tons to 4758 tons; stacks and miscellaneous, from 81,548 tons to 93,939 tons.

New Record Made in May in By-Product Coke

WASHINGTON, June 22.—Again establishing a record, the total output of by-product coke in May was 4,664,242 tons, against the previous record of 4,456,944 tons, made in April, according to the Bureau of Mines. The daily rate of 150,459 tons showed an increase of 1.3 per cent over the 148,565 tons of April. Eighty-six by-product plants were active during May, and they produced 94 per cent of their capacity.

Beehive coke production in May amounted to 597,400 tons, an increase over April of 27.7 per cent. Production of all coke was 5,261,642 tons, against 4,924,644 tons in April. Stocks of by-product coke at furnace plants on June 1 were 745,663 tons, against 750,479 tons on the corresponding date of last year, while stocks on hand at other plants were 681,925 tons and 1,001,063 tons respectively.

The sales value of by-products obtained from coke oven operation in 1928 was $151,309,528, exclusive of the value of braize production. More than one-half of this total was gas. Oil, ammonia and tar followed, in that order, with 19, 18 and 11½ per cent of the total.

Pittsburgh Iron and Steel River Traffic Off in May

Movement of iron and steel products on the Ohio River during May amounted to 102,162 tons, according to the United States Engineers' Office, Pittsburgh. This compares with 106,726 tons in April, and 112,818 tons in May, 1928. On the Monongahela River the movement totaled 88,340 tons last month, against 99,067 tons in April and 86,722 tons in May, 1928. Iron and steel traffic on the Allegheny River amounted to 525 tons in May, 1929; 210 tons in April, 1929, and 1863 tons in May, 1928.

Mechanical Handling Systems, Inc., manufacturing engineers, Detroit, opened an Eastern office on June 15 at 501 Fifth Avenue, New York, to handle engineering, estimating and sales of conveyor installations.

Employment and Payroll Totals in Identical Plants in April and March (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		April	March	April	March
Iron and steel	209	284,498	281,809	$9,558	$9,318
Foundry and machine shop	1,072	283,011	276,660	8,974	8,727
Machine tools	149	40,514	40,298	1,374	1,358
Hardware makers	69	32,635	33,457	852	877
Steam and hot-water appliances	110	34,518	35,048	1,024	1,060
Stoves	113	19,902	19,521	571	556
Structural ironwork	166	25,710	25,566	773	756
Cast iron pipe	40	11,637	11,463	272	258

(a) United States Bureau of Labor Statistics.
(b) Thousands of dollars.

Non-Ferrous Metal Markets

Copper Price Steady, Tin Sales Heavier, Zinc Firmer, Lead Firm But Unchanged

NEW YORK, June 25.

Copper. — The expected buying movement in copper both for foreign and domestic shipment has not yet developed. It is estimated that only 35,000 tons of copper has been sold in June for shipment abroad, as compared with an average of 54,000 tons a month during the past six months, so foreign buyers are expected to place larger orders soon. Domestic consumers are fairly well covered for July, but many of them must buy some metal for August. Although many of the primary producers are sold up through July, custom smelters have plenty of metal available for any delivery. The Western Union Telegraph Co. came in the market a few days ago for 2,000,000 lb. of ingot copper, but is believed to have bought copper wire instead. Prices of electrolytic and Lake copper remain firm.

Tin.—There have been fairly large sales of tin during the past week, totaling perhaps about 1200 tons. Buying interest was divided about equally between consumers and dealers. It is believed that the formation of the British-American Tin Corporation and its announced purpose of stabilizing the price of tin at £265 have been responsible for the renewed interest in the market. The £265 price aimed at by the combine is equivalent to 57.50c. a lb., as compared with today's price of 44.25c. The effort to put up tin prices has been accompanied by a great deal of propaganda which, in the opinion of the New York trade, is believed to have been put out for the purpose of influencing buying. Dealers have stocked up pretty well with tin, and the available supply at present seems to be ample for all current needs. The London price today for spot standard was £200 10s.; future standard was £203 17s. 6d. and spot Straits was £204. The Singapore price was £207 5s. These prices are slightly below those of one week ago.

Lead.—The buying of lead in the past week or 10 days has been the best in three months. Most of the buying has been for July, with some for early August. Prices are firm and unchanged.

Zinc.—This market is quiet, but prices are slightly firmer at 6.70c., East St. Louis, and 7.05c., New York. The Joplin ore price remains at $44

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	June 25	June 24	June 22	June 21	June 20	June 19
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.25	44.62½	....	44.75	44.62½	44.50
Zinc, East St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, New York	7.05	7.05	7.05	7.05	7.05	7.05
Lead, St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Lead, New York	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass 23.25c
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.

Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 46.50c. to 47.50c.
- Tin, bar ..... 48.50c. to 49.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.75c. to 8.25c.
- Lead, bar ..... 9.75c. to 10.25c.
- Antimony, Asiatic ..... 10.75c. to 11.25c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.
- Babbitt metal, commercial grade, 30.00c. to 40.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

- Tin, Straits pig ..... 49.75c.
- Tin, bar ..... 51.75c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.75c. to 8.00c.
- Lead, bar ..... 10.00c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 19.00c.
- Babbitt metal, high grade ..... 53.75c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.50c.	5.50c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

a ton. Last week's output of ore, at 13,000 tons, was slightly higher than that of the preceding week. Shipments were 12,546 tons. Sales, at 11,560 tons, showed an increase and were, in fact, the best since early April.

Antimony.—The market continues quiet, and prices are slightly easier. Chinese metal is quoted at 8.75c., duty paid, New York, for spot delivery and at 8.87½c. for futures.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 25.—The local nonferrous market is firm. New sales are in moderate volume, and shipments against old orders are liberal. The old metal market is without feature.

Prices per lb., in carload lots: Lake copper, 18.12½c.; tin, 45.62½c.; lead, 6.90c.; zinc, 6.80c.; in less-than-carload lots: antimony, 10c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Pennsylvania Buys 4000 Box Car Bodies

PURCHASE of 4000 steel box car bodies by the Pennsylvania Railroad was the feature of the past week in the railroad equipment market. The Delaware, Lackawanna & Western is inquiring for 1000 box cars, 250 steel hopper-bottom coal cars and 141 multiple unit coaches and also is taking bids on reconstruction of 141 steel coaches. The New York Central has ordered 25 switching engines and the Wabash is expected to buy 25 Mikado or Mountain type locomotives. Details of the week's business follow:

Pennsylvania Railroad has ordered 4000 steel box car bodies, dividing them as follows: Pressed Steel Car Co., 1000; American Car & Foundry Co., 900; Ralston Steel Car Co., 800; Pullman Car & Mfg. Corporation, 700; Standard Steel Car Co., 600.

Delaware, Lackawanna & Western has come into the market for 1000 box cars, 250 steel hopper-bottom coal cars, 141 multiple unit coaches, and will also take bids on reconstruction of 141 steel coaches which are to be converted into trailer cars.

New York Central has ordered 25 switching engines from Lima Locomotive Works.

Wabash is in the market for 25 Mikado or 25 Mountain type locomotives.

Cities Service Tank Line is inquiring for four 4000-gal. tank cars.

National Lead Co. is inquiring for one 10,000-gal. tank car.

Chicago & North Western has ordered five horse cars from American Car & Foundry Co.

Bangor & Aroostook has ordered four 4-8-2 type locomotives from American Locomotive Co.

American Sheet & Tin Plate Co. has ordered one 30-yd. air dump car from Koppel Industrial Car & Equipment Co.

Central Alloy Steel Corporation has ordered one 30-yd. air dump car from Koppel Industrial Car & Equipment Co.

New York, New Haven & Hartford is inquiring for from one to 50 brick hopper cars, 70 tons capacity.

A. Guthrie & Co. have ordered six 30-yd. air dump cars from Koppel Industrial Car & Equipment Co.

Youngstown Sheet & Tube Co. has ordered two 30-yd. air dump cars from Koppel Industrial Car & Equipment Co.

Reinforcing Steel

Awards of 3900 Tons—New Projects Call for 3400 Tons

THE largest awards reported for the week are 700 tons for a drainage basin at Pittsburgh and 600 tons for a Veterans' Hospital at Somerset Hills, N. J. Other tonnages were mostly small, the total amounting to about 3900 tons. New projects call for 3400 tons and include 800 tons for track elevation at Chicago. Awards follow:

NEW YORK, 124 tons, building for New York Steam Corporation, to Kalman Steel Co.

STATE OF NEW JERSEY, 300 tons, section No. 2 of bridge across Hackensack River being erected jointly by State of New Jersey and Pennsylvania Railroad, to Carroll-McCreary Co., Inc.

SOMERSET HILLS, N. J., 600 tons, buildings for Veterans' Hospital, to Concrete Engineering Co.

PITTSBURGH, 700 tons, Thirty-third Street drainage basin, to Electric Welding Co.

DETROIT, 600 tons, section one of Fox Creek sewer, to Palmer-Bee Co.

MICHIGAN CITY, IND., 100 tons, factory building, to an unnamed bidder.

CHICAGO, 140 tons, Seymour Building, to American System of Reinforcing.

CHICAGO, 150 tons, factory at Belmont Avenue and Tripp Street, to Calumet Steel Co.

EVANSTON, ILL., 150 tons, Nurses' Home for Evanston Hospital, to Concrete Steel Co.

SACRAMENTO, 149 tons, paving in Orange County, to unnamed bidder.

HAYWARD, CAL., 150 tons, mausoleum, to Truscon Steel Co.

SAN FRANCISCO, 100 tons, pier No. 48, to W. S. Wetenhall Co.

SEATTLE, 100 tons, Garfield School, to Pacific Coast Steel Co.

SEATTLE, tonnage not stated, warehouse on Eighth Avenue, to Pacific Coast Steel Co.

SEATTLE, tonnage not stated, warehouse on First Avenue South, to Northwest Steel Rolling Mills.

RENTON, WASH., 500 tons, second unit Shuffleton power plant, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1400 tons, automobile storage building for New York Central Railroad at West End Avenue and Sixty-fifth Street; general contract to Turner Construction Co.

BERWYN, ILL., tonnage not stated, Berwyn State Bank building.

CHICAGO, 100 tons, building for Victor X-Ray Corporation.

CHICAGO, 1600 tons, Fine Arts Building; R. C. Wieboldt, general contractor.

CHICAGO, tonnage not stated, store and apartment building at Chicago Avenue and Cass Street.

CHICAGO, 800 tons, track elevation for Chicago, Milwaukee, St. Paul & Pacific.

CHICAGO, 500 tons, apartment building at 1100 North Dearborn Street; McNally & Quinn, architects.

CHICAGO, 425 tons, warehouse at Orleans and Huron Streets; Languist Construction Co., general contractor.

PEORIA, ILL., 250 tons, bridge; Congress Construction Co., Chicago, general contractor.

CEDAR RAPIDS, IOWA, 500 tons, filtration plant.

PHOENIX, ARIZ., 168 tons, paving and 14 bridges, Douglas-Rodeo highway; bids July 8.

PASADENA, CAL., 750 tons, dam on San Gabriel River; bonds voted.

SEATTLE, 200 tons, Aeronautics Hall, University of Washington; bids being taken.

SEATTLE, 300 tons, Vance building; bids being taken.

SACRAMENTO, CAL., 156 tons, paving in San Diego County; bids opened.

Laconia Car Plant Closed

Directors of the Laconia Car Co., Laconia, N. H., have decided to close the company's car building department, which has been inactive for some time, and to liquidate the assets incident to that part of its business. Most of its work in former years was supplied by the Boston & Maine Railroad. The company was established nearly 100 years ago. The management has under consideration an expansion of its boat building business.

Standards for Pipe Nipples

As a portion of the campaign for eliminating waste, steel pipe nipples have been standardized on the basis of recommendations of a joint committee of manufacturers and users, in collaboration with the Department of Commerce. A pamphlet describing the standards has been issued by the Department of Commerce as CS5-29. Copies may be obtained from the superintendent of documents, Government Printing Office, Washington, at 10c.

Edward G. Budd Mfg. Co., Philadelphia, has announced resumption of payment of dividends on its common stock. Payment of a regular dividend of 25c., with a similar disbursement as an extra dividend upon completion of the present refinancing, has been authorized by the board of directors. All bank indebtedness, all sinking funds on the preferred stock and all dividends on the common stock due to Aug. 1, 1929, will be paid.

PERSONAL

FRANK W. CALDWELL, who supervised the design and construction of the Army's new propeller testing plant at Wright Field, Dayton, Ohio, has joined the organization of the Standard Steel Propeller Corporation, Pittsburgh, and will have charge of the engineering work, including research, designing propellers and improving production methods.

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S. L. GABEL, president, Summerill Tubing Co., Bridgeport, Pa., was a passenger on the Transcontinental Air Transport Line on the initial trip scheduled to start on June 24 from Columbus, Ohio, and to go to the Pacific Coast by rail and airplane. He is making the trip to study the requirements of the airplane industry, which his company serves. He plans to return over the same line, leaving Los Angeles, June 30.

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R. C. BRAND has been appointed director of sales to the oil industry for the Union Chain & Mfg. Co., Sandusky, Ohio.

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EDMUND F. KRAUSE, for nine years Los Angeles branch manager of the Wickwire Spencer Steel Co., New York, has been appointed Pacific Coast representative for the Worcester Pressed Steel Co., Worcester, Mass., George W. Prentiss & Co., Holyoke, Mass., and other wire products manufacturers.

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F. B. DANEHOWER, formerly vice-president and treasurer of the Ross-Tacony Crucible Co., Tacony, Pa., has been elected president to succeed the late Henry A. Ross. He continues as treasurer of the company. WALTER L. ROSS, JR., was elected vice-president and assistant treasurer.

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E. J. JANITZKY, metallurgist at South works, Illinois Steel Co., has returned from a two and one-half months' sojourn in Europe. He is now in New York and will go from there to Pittsburgh, where he will attend the meeting of the Bessemer improvement committee of the United States Steel Corporation.

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A. L. BUTTON, formerly secretary of the Trumbull Steel Co., now a part of the Republic Iron & Steel Co., has been named a secretary of the Peerless Electric Co., Warren, Ohio.

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J. M. MCNEAL, direct representative in Europe for the Landis Machine Co., Waynesboro, Pa., sailed on June 20 for England, after spending a month at the home office.

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HARBOUR MITCHELL, who was recently transferred to the Philadelphia office of E. J. Lavino & Co., has been elected assistant to the president.

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ALEXANDER BLACKWOOD, formerly general manager of the Chicago Steel Foundry Co., and since last September with the International Steel Corporation, Canton, Ohio, has severed his connection with the latter company and has become general manager of the Wehr Steel Co., Milwaukee.

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WILLARD A. JOHNSON, who has been connected with the Eastern division of the National Acme Co., Cleveland, and more recently in the Ohio territory, has become manager

W. A. JOHNSON

of the Eastern offices of the company at 117 Liberty Street, New York. He succeeds HARRY T. LATTO, who resigned on June 16.

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WILLIAM H. M. RIKER, formerly general superintendent of gray iron and malleable foundries of the Bridgeport Malleable Iron Works division of the Eastern Malleable Iron Co., Naugatuck, Conn., has resigned to become a consultant in foundry work, specializing in sand reclaiming. His office will be in the Wiss Building, Newark, N. J.

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ROY C. MCKENNA, president, Vanadium Alloys Steel Co., Latrobe, Pa., has been elected a director of the Vulcan Mold & Iron Co., Latrobe, Pa. EDWARD R. WILLIAMS was elected vice-president.

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R. J. WEAN, vice-president and sales manager of the Aetna-Standard Engineering Co., Youngstown, has sold his interest in the company and has established the Wean Engineering Co. to engage in special engineering and sales work in sheet and tin mill lines. He was vice-president and general manager of the Aetna Foundry & Machine Co. before that company merged with the Standard Engineering Co. in 1925. Flinn & Dreffein Co., Chicago, will be associated with him as combustion engineer.

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M. J. BERNET has been elected vice-president of the Geometric Stamping Co., Cleveland.

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J. K. FURST, has been elected president of S. R. Smythe Co., Inc., Pittsburgh, succeeding the late R. T. McCormick. M. E. BROWNE has been elected secretary and treasurer of the company, succeeding L. B. SCHMIDT, who has resigned, and WILLIAM H. REILLY has been named chief engineer.

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CLARENCE A. EARL, formerly vice-president of the American Hardware Co., New Britain, Conn., has been made president of the Charles Freshman Co., Chicago, radio manufacturer.

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Changes in Ryerson Personnel

Because of the increase in the number of plants and departments and the growing diversity of products, Joseph T. Ryerson & Son, Inc., Chicago, has found it desirable to add to the executive staff of the organization. A. M. MUELLER, general manager of sales, has become assistant secretary and a member of the board of directors. H. B. RESSLER, formerly manager of the St. Louis plant, succeeds him, and GUY H. RUMPF goes to St. Louis as manager.

ROBERT C. ROSS is advanced from general traffic manager to assistant to the president, in charge of plant operations. In his capacity as chairman of the Midwest Shippers' Advisory Board from 1923 to 1929, he aided shippers in securing better freight service. WILLIAM H. BRYANT, who was assistant manager of sales in the Chicago country territory, has been made Chicago sales manager in charge of country and city store sales. HARRY W. TRELEAVEN has been elected assistant treasurer and will continue to be responsible for office management.

Steel Club Has Outing

The Steel Club of Philadelphia held its annual invitation golf tournament at the Aronimink Golf Club, near Philadelphia, June 21. About 175 were present. A large number of valuable prizes were distributed at the dinner which was presided over by W. S. Haring, of the Alan Wood Steel Co. Thomas C. Ham, district sales manager of the Jones & Laughlin Steel Corporation, at Philadelphia, arrayed as master of hounds, had charge of the special stunt sports, and Frank W. Jones, Eastern Steel Co., had charge of the despatching of the golfers.

Gear Association Officers Reelected

A. F. Cooke, vice-president of the Pittsburgh branch of Gears & Forgings, Inc., Cleveland, was reelected president of the American Gear Manufacturers Association, at a meeting of the executive committee of the association, held at the Hotel Astor, New York, June 10.

B. F. Waterman, engineer Brown & Sharpe Mfg. Co., Providence; E. W. Miller, engineer Fellows Gear Shaper Co., Springfield, Vt., and Warren G. Jones, president W. A. Jones Foundry & Machine Co., Chicago, continue as first vice-president, second vice-president and treasurer, respectively. The secretary of the association is T. W. Owen, 3608 Euclid Avenue, Cleveland.

A. F. COOKE

The fall meeting of the A. G. M. A. will be held Oct. 24, 25 and 26 at Briarcliff Lodge, Briarcliff Manor, N. Y.

Continental Can Co. Buys Nashville Plant

Continental Can Co., New York, has purchased the assets and properties of the Federal Can Co., Nashville, Tenn., coffee can manufacturer. The latter will be operated as a branch under the management of its president, W. D. Trabue. Expansion of manufacturing facilities is contemplated.

Vote to Continue International Steel Cartel

WASHINGTON, June 25.—The International Steel Cartel will be prolonged beyond Oct. 31, 1929, the first date on which withdrawal would have been permitted under the terms constituting it. Decision to continue the cartel, according to a cablegram received by the Department of Commerce from D. A. Reagan, acting commercial attaché at Paris, was made by unanimous vote at a meeting in that city on June 18. The entente reserved decision as to the length of its prolongation, a question which it is expected to settle at the next meeting in Vienna, Sept. 22 to 28.

The Paris meeting also resulted in the annual production quota again being increased, this time by 1,000,000 metric tons annually, bringing the total program up to 32,287,000 tons per year, and production on this basis will begin with the third quarter. Just before the opening of the second quarter of the present year the quota was increased by 2,000,000 tons from the old figure of 29,287,000 tons, which had been in effect over several years.

Dr. Sauveur to Be Campbell Memorial Lecturer

Dr. Albert Sauveur, Gordon McKay professor of metallurgy and metallography in Harvard University and dean of American metallurgists, has accepted the invitation of the board of directors of the American Society for Steel Treating, to present the E. D. Campbell Memorial Lecture for 1929.

This lecture was established by the directors of the A.S.S.T. in 1926 to perpetuate the memory of its honorary member, Dr. Edward DeMille Campbell, of the University of Michigan. The first lecture was presented by Dr. Guertler of Germany; the second by Dr. Zay Jeffries of Cleveland and the third by Dr. W. H. Hatfield of England. Dr. Sauveur's lecture will be presented on Wednesday morning during the National Metal Congress and Exposition to be held in Cleveland during the week of Sept. 9.

Jones & Laughlin to Erect Coke Ovens at Aliquippa

The Jones & Laughlin Steel Corporation, Pittsburgh, has let a contract to the Koppers Co., Pittsburgh, for the construction of 81 additional by-product coke ovens at its Aliquippa, Pa., plant. The company already has 122 by-product ovens in operation at Aliquippa. The additional ovens will produce 600,000 tons of coke annually, and will add about 835,000 tons to the coal requirements of the plant.

Obituary

OLIVER AMES, son of Frederick L. Ames, founder of the Ames Shovel & Tool Co., North Easton, Mass., died at his home in that town on Tuesday afternoon, June 18, following a short illness. Mr. Ames was born in North Easton, Oct. 21, 1864, and attended private schools in Quincy, Mass., and in Boston. He was graduated from Harvard College in 1886, and then, with classmates, toured the world, following which he entered the tool and shovel business. He was interested in Western and Middle Western railroads, and was a member of the board of directors of the General Electric Co.

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OLIVER GEE, treasurer of William W. Hearne, Inc., Philadelphia, since its organization in 1924, died at his home in Haddonfield, N. J., June 20. He started in the iron ore and manganese ore business in 1892 with George K. Barnes & Co., agents for H. Borner & Co., Ltd., London. Later he became general manager of the iron and manganese ores department of Matthew Addy & Co., and remained with the company until it discontinued business in 1924. He was 66 years old.

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ROBERT W. REED, secretary Mullins Tank & Body Co., Milwaukee, died June 18 after a brief illness, aged 40 years. He was the son of William J. Reed, president-treasurer, Reed-Waite Co., Milwaukee, manufacturer of automotive equipment and accessories.

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EDWARD H. BINDLEY, vice-president, Pittsburgh Steel Co., and president, Neely Nut & Bolt Co., Pittsburgh, died suddenly on June 21 at his home in that city. He was born in 1878 and was graduated from Yale University in 1900. He had been identified with the Pittsburgh Steel Co. since that time and was made a director in 1906. He was elected a vice-president of the company in 1921. His association with the Nut & Bolt company began in 1910 and he had been president for a number of years. Mr. Bindley had also been prominently identified with Pittsburgh financial institutions and with civic work.

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CHURCH ALEXANDER WILLIAMS, formerly identified with the steel business in the Pittsburgh district, died at the West Penn Hospital, Pittsburgh, on June 23. He was associated for a number of years with the Illinois Steel Co., Chicago, and later served as superintendent of the Verona Steel Casting Co., Pittsburgh. During the war he served as superintendent of open-hearth furnaces for the Tata Iron & Steel Co. in India. In recent years he had been identified with the life insurance business in Pittsburgh.

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PETER S. VANDERKLOOT, president, Vanderkloot Steel Works, Chicago fabricator, died June 25, aged 67 years. He had been a resident of the Chicago district for 62 years. The business which he headed was founded by his father, Marinus Vanderkloot, a pioneer Chicago manufacturer.

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ERNEST S. HOBBS, former president, Fox River Manufacturers' Association, died June 23 at his summer home at Lake Geneva, Wis.

Fabricated Structural Steel

Awards of 61,000 Tons Include 25,000 Tons for Michigan Steel Plant—New Projects Total 21,500 Tons

MORE than half of the week's total of 61,000 tons of fabricated steel awards was in two projects, 25,000 tons in the plant of the Great Lakes Steel Corporation, Ecorse, Mich., and 7000 tons in bridges for the Pittsburgh & West Virginia Railroad. New projects reached a larger total than in the two previous weeks, with bids asked on 21,500 tons. The largest inquiries were 5000 tons for a railroad bridge at Rainy River, Ont., and 4200 tons for a building for the Shell Oil Co. in San Francisco. Awards follow:

SOUTH DARTMOUTH, MASS., 150 tons, hangar, to Austin Co.

HARTFORD, CONN., 200 tons, automobile sales and service station, to an unnamed fabricator.

TORRINGTON, CONN., 150 tons, hospital, to American Bridge Co.

NEW YORK, 700 tons, Warner Brothers Theater, Fifty-first Street and Seventh Avenue, to Harris Structural Steel Co.

NEW YORK, 2100 tons, telephone building at Thirteenth Street and Second Avenue, to Taylor-Fichter Steel Construction Co.

NEW YORK, 3400 tons, hotel at Fifty-ninth Street and Sixth Avenue, to Harris Structural Steel Co.

PORT WASHINGTON, N. Y., 1200 tons, American Aeronautical Corporation, to Fort Pitt Bridge & Iron Co.

BLOOMFIELD, N. J., 500 tons, Bloomfield Bank & Trust Co., to Hay Foundry & Iron Works.

BLOOMFIELD, 1400 tons, addition to plant of Prudential Printing Co., to Hay Foundry & Iron Works.

ATLANTA, GA., 400 tons, substation for Georgia Power Co., to Nashville Bridge Co.

ELIZABETHTON, TENN., 2300 tons for industrial buildings, to McClintic-Marshall Co.

OPELIKA, ALA., 280 tons, cotton mill addition, to Virginia Bridge Co.

ECORSE, MICH., 25,000 tons, plant for Great Lakes Steel Corporation, to McClintic-Marshall Co.

DETROIT, 187 tons, Cadillac Motor Car Co., to McClintic-Marshall Co.

DETROIT, 937 tons, Chevrolet Motor Co., to R. C. Mahon Co.

DEARBORN, MICH., 965 tons, airplane factory for Ford Motor Co., to Whitehead & Kales Co.

TORONTO, 700 tons, Bathurst Street bridge, to Dominion Bridge Co.

CLEVELAND, 225 tons, Aspinwall Avenue bridge for Cleveland Union Terminals Co., to McClintic-Marshall Co.

PITTSBURGH & WEST VIRGINIA RAILROAD, 7000 tons, 6600 tons for Monongahela bridge at Belle Vernon, Pa., to American Bridge Co.; 400 tons, bridge work, to McClintic-Marshall Co.

MICHIGAN CITY, IND., 5000 tons, power plant, to McClintic-Marshall Co.; previously reported to an unnamed bidder.

CHICAGO HEIGHTS, ILL., 275 tons, National Brick Co., to Wisconsin Bridge & Iron Co.

CHICAGO, 500 tons, Maytag Co., to Mississippi Valley Structural Steel Co.

CHICAGO, 500 tons, building at 430 North Michigan Avenue, to Mississippi Valley Structural Steel Co.

CHICAGO, 187 tons, Weiland Drug Co., to Vanderkloot Steel Works, local.

EVANSTON, ILL., 625 tons, Nurses' Home for Evanston Hospital, to Midland Structural Steel Co., Chicago.

MELROSE PARK, ILL., 250 tons, crane runway for American Brake Shoe & Foundry Co., to American Bridge Co.

CHICAGO & ALTON, 240 tons, girder spans, to American Bridge Co.

MINNEAPOLIS, 250 tons, addition to memorial building at University of Minnesota, to American Bridge Co.

KANSAS CITY, MO., 1565 tons, corrected tonnage, Professional Building, to Kansas City Structural Steel Co.

KANSAS CITY, 500 tons, office building, to McClintic-Marshall Co.

OMAHA, NEB., 125 tons, building for Burlington Railroad, to Vierling Steel Works.

OMAHA, 1000 tons, addition to Telephone Building, to Omaha Steel Co.

HILLSBURG, MAN., 120 tons, bridge, to Manitoba Bridge & Iron Works, Winnipeg.

FRISCO LINES, 400 tons, bridges, to American Bridge Co.

SAN DIEGO, CAL., 140 tons, two ferry bridges, to Consolidated Steel Corporation.

ALHAMBRA, CAL., 100 tons, lodge for B. P. O. E., to unnamed interest.

SANTA ANA, CAL., 125 tons, store, Fifth and Main Streets, to Pacific Iron & Steel Co.

LOS ANGELES, 3000 tons, Southern California Edison Co. building, to Consolidated Steel Corporation.

LOS ANGELES, 2500 tons plates, six 118,000-bbl. tanks for Texas Oil Co., to Lacy Mfg. Co.

SAN FRANCISCO, 980 tons, Metropolitan Life Insurance Co. building addition, to Judson-Pacific Co.

SAN FRANCISCO, 100 tons, apartment building, Pacific and Van Ness Avenue, to McClintic-Marshall Co.

OLYMPIA, WASH., 200 tons, bridge for Polson Logging Co., to Wallace Bridge & Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

LAWRENCE, MASS., 200 tons, Boston & Maine Railroad bridge.

HARRISBURG, PA., 1000 tons, hotel.

STATE OF NEW JERSEY, 6000 tons, highway bridge over Hackensack River at Kearny; bids in.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 4000 tons, catenary supports for electrification, Hoboken to Dover, N. J.; bids in.

PITTSBURGH, 1700 tons, auditorium for H. J. Heinz Co.

CLEVELAND, 100 tons, Berea Road bridge for city.

SAGINAW, MICH., 2000 tons, telephone exchange.

DETROIT, 1000 tons, addition for Detroit Steel Products Co.

RAINY RIVER, ONT., 5000 tons, bridge for Canadian National Railways.

FLINT, MICH., 1600 tons, bank building.

FORT WAYNE, IND., 1000 tons, Lincoln Loan & Trust Co. building.

WAUKEGAN, ILL., 300 tons, addition to power plant of Public Service Co.

CHICAGO, tonnage not stated, building for Fox Film Corporation.

CHICAGO, 1500 tons, garage; J. B. French Co., general contractor.

SPRINGFIELD, ILL., 400 tons, bridge for Chicago & Illinois Midland.

UNION PACIFIC, 350 tons, plate girder spans.

OMAHA, NEB., 1000 tons, train sheds.

PASADENA, CAL., 9000 tons plates, 60-in. riveted pipe line; bonds voted.

LOS ANGELES, 600 tons, exhibit building at Pomona Fair Grounds; McClintic-Marshall Co., low bidder.

OAKLAND, 100 tons plates, 54-in. riveted siphon, East Bay Municipal Utility District; bids July 10.

SAN FRANCISCO, 4200 tons, Shell Oil Co. building; bids opened.

SAN FRANCISCO, 100 tons, apartment building, O'Farrel and Leavenworth Streets; bids opened.

SACRAMENTO, 435 tons, bridge over Trinity River; call for bids withdrawn.

Use Half of World's Antimony

American industries consume each year nearly half of the world's production of antimony, according to a study of the marketing of that metal made by J. W. Furness, chief of the Commerce Department's mineral division. Production of this metal in the United States is negligible.

Consumption of virgin antimony in normal times is greatly influenced by the reclaimed metal. In times of war consumption is markedly increased. During the past five years it has varied between 18,000 and 29,000 tons.

World production of zinc for the 127 years since the beginning of the nineteenth century was 37,223,000 tons, nearly one-third of which has been produced in the United States, according to an economic study conducted by the United States Bureau of Mines. This was a remarkable showing for a metal so little known at the beginning of the period and compares favorably with a copper production of 40,498,000 tons during the same years, even though copper was being produced at a rate 30 times greater than zinc at the beginning of the period.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

Port	May, 1929	May, 1928	Season to June 1—1929	Season to June 1—1928
Escanaba	876,161	630,630	1,255,297	636,576
Marquette	661,749	317,036	909,424	317,036
Ashland	1,280,490	633,756	1,533,115	633,756
Superior	2,703,923	1,529,803	3,349,722	1,529,803
Duluth	3,037,027	1,669,888	3,770,288	1,669,888
Two Harbors	989,923	581,702	1,247,668	581,702
Total	9,549,273	5,362,815	12,065,514	5,368,761
Increase	4,186,458	.....	6,696,753	.....

Machinery Markets and News of the Works

Machinery Buying Recedes

Except in New York District, Bookings Have Declined from High Level of May

MACHINE tool buying is receding somewhat from the high level maintained during the first five months of the year. A notable exception, however, is the New York district, where recent sales have been large enough to place the first three weeks of June on a par with the corresponding period in May.

Although inquiries have dropped off indicating lessened interest on the part of users, operating schedules of machine tool builders are expected to continue at the present rate during the summer on account of the large volume of unfilled orders which have accumulated in the past few months.

Absence of sizable individual transactions is still pronounced, but this has been fairly well offset by the liberal number of orders for one or two machines each.

At Chicago, farm implement manufacturers are hesitant about purchasing tools, but several builders having substantial expansion programs under way are likely to carry them to completion.

The Self-Aligning Bearing Co., New York, has bought about $70,000 worth of tools for a new ball bearing plant at Paynter and Ely Avenues, Long Island City, N. Y. Fair-sized lots of tools also have been purchased by Mack Trucks, Inc., Plainfield and New Brunswick, N. J., and by the Fairchild Aviation Corporation, Farmingdale, Long Island, N. Y. The latter is rounding out equipment for production of a British airplane engine known as Armstrong-Siddeley-Genet, on which American manufacturing rights have been acquired. The motor-building plant of the company has lately been engaged on marine engines for the Wright Aeronautical Corporation.

Commissions from France and Belgium are expected to visit American machine tool manufacturers this fall preparatory to buying equipment.

While some bookings have come from the Michigan automobile industry, buying from that source probably will not assume impressive proportions until fall.

New York

NEW YORK, June 25.—Machine tool sales have held up surprisingly well this month. Early in the month there were some evidences of a tapering off, but subsequent sales have been large enough to place the first three weeks of June on a par with the corresponding period in May. Orders during the week have included fair-sized lots bought by the Fairchild Aviation Corporation, Farmingdale, Long Island, and Mack Trucks, Inc., Plainfield and New Brunswick, N. J. The Self-Aligning Bearing Co. has bought about $70,000 worth of tools for a new ball bearing plant at Paynter and Ely Avenues, Long Island City.

Fairchild Aviation Corporation is rounding out equipment at its Farmingdale plant for production of a British airplane engine known as Armstrong-Siddeley-Genet, on which American manufacturing rights have been acquired. Motor-building plant of company has lately been engaged on marine engines for Wright Aeronautical Corporation.

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Machinery Markets and News of the Works

Machinery Buying Recedes

Except in New York District, Bookings Have Declined from High Level of May

MACHINE tool buying is receding somewhat from the high level maintained during the first five months of the year. A notable exception, however, is the New York district, where recent sales have been large enough to place the first three weeks of June on a par with the corresponding period in May.

Although inquiries have dropped off indicating lessened interest on the part of users, operating schedules of machine tool builders are expected to continue at the present rate during the summer on account of the large volume of unfilled orders which have accumulated in the past few months.

Absence of sizable individual transactions is still pronounced, but this has been fairly well offset by the liberal number of orders for one or two machines each.

At Chicago, farm implement manufacturers are hesitant about purchasing tools, but several builders having substantial expansion programs under way are likely to carry them to completion.

The Self-Aligning Bearing Co., New York, has bought about $70,000 worth of tools for a new ball bearing plant at Paynter and Ely Avenues, Long Island City, N. Y. Fair-sized lots of tools also have been purchased by Mack Trucks, Inc., Plainfield and New Brunswick, N. J., and by the Fairchild Aviation Corporation, Farmingdale, Long Island, N. Y. The latter is rounding out equipment for production of a British airplane engine known as Armstrong-Siddeley-Genet, on which American manufacturing rights have been acquired. The motor-building plant of the company has lately been engaged on marine engines for the Wright Aeronautical Corporation.

Commissions from France and Belgium are expected to visit American machine tool manufacturers this fall preparatory to buying equipment.

While some bookings have come from the Michigan automobile industry, buying from that source probably will not assume impressive proportions until fall.

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Bradford Gasoline Co., Bradford, Pa., is planning to rebuild part of compressor plant, storage and distributing works destroyed by fire June 17.

United States Radiator Corporation, Union Bank Building, Pittsburgh, has awarded general contract to B. A. Groah Construction Co., 847 West North Avenue, for one and two-story factory branch and distributing plant, 100 x 150 ft., to cost over $65,000 with equipment.

Chicago, Wilmington & Franklin Coal Co., 332 South Michigan Avenue, Chicago, has plans for expansion at Eccles, W. Va., including new steel tipple, coal-washing plant and other units, with additional equipment, pit cars, etc., to cost over $1,000,000. Allen & Garcia Co., Chicago address noted, is engineer.

Hancock Mfg. Co., New Cumberland, W. Va., has begun excavations for new one-story unit to cost about $80,000, to be equipped primarily for production of steel stampings.

Detroit

DETROIT, June 24.—Bids will soon be asked by Checker Cab Mfg. Co., Gibson and South Pitcher Streets, Kalamazoo, Mich., for one and two-story addition, to cost about $450,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Gabriel Steel Co., 2441 Bellevue Avenue, Detroit, has awarded general contract to A. A. Albrecht Co., Penobscot Building, for one-story addition, to cost more than $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Walbert Mfg. Co., Chicago, has been organized with capital of $1,500,000 to manufacture radio equipment and parts. Company will take over company of same name, with local plant at 1000 Fullerton Avenue, specializing in radio equipment, and Story & Clark Piano Co., Chicago and Grand Haven, Mich. New company will concentrate production largely at last-noted place; Chicago works of former Walbert company will be moved to Grand Haven, occupying a unit of Story & Clark company, with installation of additional equipment for output of 1000 complete radio sets daily. Consolidation will also include Club Aluminum Utensil Co., Chicago and New York.

Krohn Differential Corporation, Chicago, has leased factory property at Buchanan, Mich., and will establish branch to manufacture differential gears for motor trucks and passenger automobiles, as well as for production of power dividing units for six-wheel trucks. Initial plant will cost over $75,000. Manufacture will also be continued at Chicago for present, with removal of engineering department to Buchanan soon.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has work under way on a one and two-story oil refinery at Trenton, Mich., to cost more than $1,000,000.

Arvey Corporation, 6400 East Nevada Street, Detroit, manufacturer of automobile parts, has plans for an addition to cost about $40,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects.

Board of Education, City Hall, Grand Rapids, Mich., has awarded general contract to Lind, Gustafson & Klopfer Co., 315 Fifth Street, N. E., Minneapolis, for five-story vocational and technical high school, to cost $550,000 with equipment. Turner & Thebaud, Michigan Trust Building, Grand Rapids, are architects; W. W. Bradfield, last-noted address, is engineer.

Lindeair Corporation, Kirkland Street, Grand Rapids, manufacturer of acetylene gas equipment, subsidiary of Prest-O-Lite Co., New York, has awarded general contract to John McNabb & Sons, Grand Rapids, for one-story addition to cost about $65,000 with equipment.

Pyramid Stamp & Tool Co., Madison and Beaubien Streets, Detroit, has been organized to manufacture power and hand-marking machines, automatic numbering machines, steel stamps, and embossing dies, etc. It has purchased equipment, including a Hoskins electric automatic control furnace and a special electric drawing bath for steel treating. Carl O. Malmstrom is president; H. C. Rickenbach, vice-president, and P. J. Rickenbach, secretary-treasurer.

Federal Pipe & Tube Co., Six Mile Road and Mount Elliott Street, Detroit, has been organized to engage in second-hand pipe business. Company will purchase used pipe and tubes for reclaiming at its Detroit plant.

New England

BOSTON, June 24.—Sales of new machine tools the past week while not large were fairly numerous and included planers, radial drills, milling machines, a boring mill, lathes, a die sinker and miscellaneous tools. High-speed lathes seem to be moving in greater volume than any other type of tool. Used tool business is dull. Recent sales include an 8-ft. Flather and other lathes, presses, tapping machines and shapers.

Further contraction in small tool buying is reported, but weekly bookings are still ahead of last year.

Machinists' vises have been advanced from 25 to 20 per cent off list and combination pipe types of vises from 16 2/3 to 12½ per cent off list.

City of Westerly, R. I., is completing plans for a $500,000 junior high and industrial school which will require metal and wood-working equipment.

Leavitt Machine Co., 10 East River Street, Orange, Mass., has started work on a one-story foundry, 40 x 100 ft.

Leonard & Rooke Co., 486 Broad Street, Providence, R. I., manufacturer of valves, has plans for a three-story and basement addition, 60 x 100 ft.

Taber Cadillac Co., 120 Allyn Street, Hartford, Conn., has closed bids on a service station and sales building, 140 x 180 and 95 x 130 ft.

Contract has been let by Wiremold Co., 410 Asylum Street, Hartford, Conn., manufacturer of conduits, electric-wiring devices, etc., to Bartlett-Brainard Co., 252 Asylum Street, for two-story plant at Elmwood, 98 x 200 ft., to cost about $65,000 with equipment. Greenwood & Noerr, 525 Main Street, are architects and engineers.

Stedfast Rubber Co., Mattapan, Mass., has acquired for expansion property at North Easton, Mass., improved with factory, heretofore held by General Electric Co. It is said that present mill will be removed to new location and additional machinery installed.

Lux Clock Mfg. Co., 97 Sperry Street, Waterbury, Conn., manufacturer of clocks and clock mechanisms, is asking bids on general contract until July 1 for four-story addition, 45 x 145 ft., to cost about $140,000 with equipment. T. M. Freney, 51 Leavenworth Street, is architect.

Fafnir Bearing Co., New Britain, Conn., manufacturer of ball bearings, transmission equipment, etc., has arranged for purchase of plant and business of Railway Motors Corporation, De Pere, Wis., manufacturer of roller journal-bearings, and will consolidate. Acquired plant will be continued for present at De Pere, and removed later to New Britain, where production will be concentrated.

East Coast Aircraft Corporation, Boston, has filed plans for a hangar with repair facilities at 480 Maverick Street, where airport has been established, to cost about $50,000 with equipment.

Barnum Forge Co., Barnum Avenue, Stratford, Conn., has awarded general contract to Eagle Construction Co., Bridgeport, for one-story addition, 60 x 100 ft., to cost about $25,000 with equipment.

Snowmobile Co., West Ossipee, N. H., plans rebuilding machine and mechanical shop destroyed by fire June 21.

Norton Co., Worcester, Mass., has started erection of another building, in addition to two already announced. Third building will replace plant 1 annex, and will be five stories. It will be triangular in shape with maximum width about 80 ft. and length about 124 ft. First floor will be used for conveying system, second for inspection and upper three floors for storage. Company is also erecting a warehouse in Cleveland.

Heald Machine Co., Worcester, manufacturer of grinding machines, has started work on a new building, 105 x 360 ft. one story, for expansion.

Riley Stoker Corporation, Worcester, has acquired an interest in La Mont Corporation, New York, and has removed its headquarters to Worcester. La Mont company is the owner of patents covering a new method of generating steam, and apparatus for this purpose is now being developed by Riley Corporation, which has branch plants in Detroit, Decatur, Ill., and Toronto, Ont.

Merrill & Usher Co., Worcester, dealer in sheet metals and machinery, has acquired a building on Arctic Street, which will provide considerable increase in floor space.

Indiana

INDIANAPOLIS, June 24.—Appropriation of $100,000 has been made by City Council, City Hall, Indianapolis, for hangars with repair facilities and administration building at municipal airport, where 900-acre tract is available. McGuire & Shook, 941 North Meridian Street, are architects.

C. A. Dunham Co., 450 East Ohio Street, Chicago, manufacturer of heating apparatus, pumping equipment, etc., has awarded general contract to Tonn & Blank, Michigan City, Ind., for first unit of new plant at Michigan City, one story, 350 x 350 ft., to cost over $500,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is architect and engineer.

Northern Indiana Public Service Co., Lafayette, has plans for one-story hoisting engine unit and equipment storage and distributing plant, to cost about $35,000. Frank P. Riedel, Lafayette Life Building, is architect.

Auburn Automobile Co., Auburn, has plans for one-story engineering building, to cost about $65,000 with equipment. A. M. Strauss, Cal-Wayne Building, Fort Wayne, is architect. Officials of company, headed by E. L. Cord, president, have organized Cord Corporation, to take over Auburn company, Lycomnig Mfg. Co., Williamsport, Pa., manufacturer of gasoline engines, and other affiliated organizations. Company is arranging for stock issue to total $1,250,000, part of fund to be used for expansion.

George B. Limbert & Co., 570 Fulton Street, Chicago, manufacturers of iron pipe, steam-fitters' supplies and kindred equipment, have taken bids for extensions and improvements in branch plant at East Chicago, Ind., to cost about $55,000 with equipment. Briggs & Almy, 608 South Dearborn Street, Chicago, are architects and engineers.

Stauffer Chemical Co., Rives-Strong Building, Los Angeles, manufacturer of industrial chemicals, has asked bids on general contract for branch plant at Hammond, Ind., to cost over $500,000 with machinery. A. C. Mohr is company engineer.

Arthur Chevrolet, Indianapolis, will manufacture four-cylinder, air-cooled, inverted airplane engine having duplicate parts. Engine weighs 325 lb. and will develop 150 hp. at 2700 r.p.m.

Chrobaltic Tool Co., 1501 Ferry Avenue East, Detroit, has completed addition to its No. 2 foundry at Michigan City, Ind., which substantially increases its capacity. Company specializes in high-duty alloys and fire armor for resisting maximum temperatures.

Chicago

CHICAGO, June 24.—Transactions in machine tools continue to taper. Of special moment to the local trade is a noticeable tightening in inquiry and purchases by farm implement manufacturers who are showing less certainty as to demand for their products in the near future. Several farm machinery builders have large expansion programs well under way and so far it appears that they will carry out these plans.

Orders for the most part are spotty and individually small. The railroads are showing little interest in machine tools and the automobile trade, with the exception of a Wisconsin motor builder, is out of the market. For the first time in several months deliveries are more favorable. Demand for used tools is still in excess of supply and prices are unusually high.

Carlson Forgings Co., 727 Fulton Street, Chicago, will build a one-story shop, 86 x 200-ft., to cost $33,000. Walter Hess, 1225 North Maplewood Avenue, is engineer.

Link-Belt Co., 310 West Pershing Road, Chicago, has plans for a boiler room, 30 x 48-ft., to cost $26,000. W. L. Fergus Co., 1509 Fisher Building, is architect.

Deere & Mansur Co., Davenport, Iowa, has been granted a permit for a foundry addition.

Buda Co., Harvey, Ill., has awarded contract for an addition to cost $25,000.

Contract has been let by B. Mercil & Sons Plating Co., 1911 Fulton Street, Chicago, manufacturer of plated metal goods, to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story addition, to cost about $45,000 with equipment.

Coca Cola Co., 1032 South Crawford Avenue, Chicago, has awarded general contract to G. Thomson & Son Co., 30 North La Salle Street, for two-story bottling, storage and distributing plant, 116 x 300 ft., to cost $200,000 with equipment. Quinn & Christiansen, 360 North Michigan Avenue, are architects.

Standard Stamping & Perforating Co., 4718 West Fifth Avenue, Chicago, manufacturer of perforated metals, screens, etc., is planning one-story unit 90 x 145 ft., to cost about $35,000 with equipment.

Robinson Refrigerator Works, 2326 South Western Avenue, Chicago, has leased 28,000 sq. ft. in terminal building in Cook Industrial District, for expansion. Later company plans new unit, totaling 35,000 sq. ft. floor space, to cost about $100,000 with equipment.

A. Leath & Co., 951 Raymond Street, Elgin, Ill., have plans for power house addition at factory to cost about $25,000.

Northwest Paper Co., Cloquet, Minn., is said to be arranging an expansion program, to cost more than $1,000,000 with equipment. A new paper-making machine will be installed and auxiliaries for large increase in present capacity.

Peerless Chain Co., Front and Walnut Streets, Winona, Minn., has plans for a one-story and basement addition, 50 x 65 ft., to cost about $25,000 with equipment. Boyum, Schubert & Sorenson, 117 West Third Street, are architects.

Minnesota Mining & Mfg. Co., Forest and Fauquier Streets, St. Paul, Minn., manufacturer of abrasive products, mining equipment, etc., will soon take bids for a two-story and basement addition, to cost $140,000 with equipment. Toltz, King & Day, Inc., Builders' Exchange, is architect and engineer.

Blackhawk Foundry & Machine Co., 323 Clark Street, Davenport, Iowa, has plans for a one-story and basement foundry addition, 120 x 162 ft., to cost about $65,000 with equipment. Clausen, Kruse & Klein, Kahl Building, are architects.

Board of Education, Iowa State Bank Building, Burlington, Iowa, plans installation of manual training equipment in new junior high school to cost $250,000, for which plans are being drawn by C. L. Ritts, Eisfeld Building, architect. William B. Ittner, 911 Locust Street, St. Louis, is consulting architect.

Onsrud Machine Works, Inc., 3908 Palmer Street, Chicago, is erecting a foundry, 80 x 150 ft., which will be ready for occupancy in about two months. New building will be used to manufacture larger machines made by company.

Standard Stamping & Perforating Co., 4718 West Fifth Avenue, Chicago, will move on Aug. 1 to its new plant at 3129 West Forty-ninth Place, Chicago. Company has purchased about $15,000 worth of new machinery. H. H. Stone is president; T. Humphrey, vice-president; S. Stone, secretary-treasurer.

Iowa Boiler Works, Fort Dodge, Iowa, and Iowa Machine Shop have been merged and will operate as Iowa Machine & Boiler Works. S. W. Smith is manager. Machine shop, which adjoins boiler works, has been idle for several months. Changes in both plants have been completed and operations are under way.

Cincinnati

CINCINNATI, June 24.—Bookings of machine tools continue in sufficient volume to keep plants busy. Absence of large buying is particularly noticeable, but the general run of individual orders is good. Demand is generally for standard tools although occasional specialties are requested. Quite a few inquiries are on file from automobile manufacturers despite the reported quietness of the automotive industry. One local manufacturer has received an order for motor-driven lathes from the Wabash Railroad.

Several commissions from France and Belgium are expected to attend the Cleveland machine tool exhibit this fall and then to visit Cincinnati to inspect offerings of local companies.

Contract has been let by General Outdoor Advertising Co., 110-14 Grimes Street, Dayton, Ohio, manufacturer of signs, displays, etc., to A. P. Ziegler, Inc., Dayton, for extensions and improvements to cost about $25,000.

Reynolds Metal Co., subsidiary of United States Foil Co., 2934 Grand Avenue, Louisville, is said to be planning new three-story unit for manufacture of aluminum powder and kindred products, to cost about $75,000 with equipment.

Chicago Hardwood Lumber Co., 10 South La Salle Street, Chicago, has plans for new plant at Sequatchie, Tenn., to manufacture fireproof lumber products, including machine shop, forge shop and other mechanical departments, to cost more than $350,000 with equipment. A. K. Foss is general manager.

Department of Public Service, Urbana, Ohio, E. S. Sweetman, director, is said to be considering plans for a municipal electric light and power plant, to cost about $400,000 with equipment.

Cumberland Falls Hydro Electric Power Co., Cumberland Falls, Ky., an interest of Kentucky Utilities Co., Stark Building, Louisville, is planning construction of a hydroelectric generating station on Cumberland River, near Cumberland Falls, to cost over $400,000 with power dam and transmission lines.

Cherokee Oil Co., Inc., 818 Van Street, Knoxville, Tenn., has plans for storage and distributing plant, with pumping station, etc., to cost about $30,000 with equipment.

Glow Electric Co., 15 East Second Street, Cincinnati, has asked bids on general contract for five-story storage and distributing plant, 50 x 80 ft., to cost about $40,000 with equipment. John Boll is company architect.

Procter & Gamble Co., Spring Grove Avenue, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., for addition to plant, to cost over $75,000 with equipment.

Bingham Tool & Supply Co., 1104 Broadway, Cincinnati, has been incorporated with capital stock of $25,000 and will engage in jobbing of abrasives, cutting tools and small factory supplies.

Modern Engineering Co., 1537 West Broadway, Louisville, Ky., has been appointed distributer for Louisville and surrounding territory for "Meco" welding and cutting apparatus, manufactured by Modern Engineering Co., St. Louis. Latter company has appointed Sales Engineering Co., 1032 Thirty-eighth Street, Milwaukee, its Wisconsin distributer.

South Atlantic

BALTIMORE, June 24. — Contract has been let by Procter & Gamble Co., Sixth and Main Streets, Cincinnati, to Frainie Brothers & Haigley, 19 West Franklin Street, Baltimore, for new plant in Locust Point district, Baltimore, including power house, machine shop and other units, to cost about $3,500,000 with machinery. Henry Manley, 5 East Fifty-third Street, New York, is architect.

J. M. Reiser & Sons, 620 Portland Street, Baltimore, manufacturer of barrels, kegs and other wirebound containers, is planning one-story branch plant, 100 x 100 ft., to cost over $40,000 with equipment.

Chesapeake & Ohio Railroad Co., Richmond, Va., has filed plans for a new power plant and oil house at local repair shops, to cost about $75,000 with equipment. C. W. Johns is chief engineer.

Maryland Meter Works, Inc., 301 East Saratoga Street, Baltimore, has awarded general contract to North Eastern Construction Co., 6 West Madison Street, for addition to cost about $40,000 with equipment. Theodore W. Pietsch, American Bank Building, is architect.

E. L. Myers Co., Bond Building, Fourteenth Street and New York Avenue, N. W., Washington, consulting engineer, has been engaged to prepare plans for power plant for Government to cost about $500,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in three-story plant at Washington, to be erected by General Baking Co., 420 Lexington Avenue, New York, for which general contract has been let to C. L. Stockhausen Co., 33 South Gay Street, Baltimore, to cost $200,000. C. B. Comstock, Forty-second Street and Lexington Avenue, New York, is architect and engineer.

Pulaski Iron Co., Pulaski, Va., plans installation of new equipment at sintering plant and cast house.

Pan-American Petroleum & Transport Co., 120 Broadway, New York, is reported planning new oil refinery near Savannah, Ga., to cost more than $1,000,000 with machinery. A subsidiary will be formed to carry out construction and operate plant.

Norman B. Hafleigh, head of Hafleigh & Co., Inc., Pulaski and Ruffner Streets, Philadelphia, Pa., manufacturer of buttons, and associates have organized Carolina Button Corporation, capitalized at $40,000, to construct and operate plant at Mount Airy, N. C., one story, to cost about $50,000 with equipment. T. R. Robertson, Mount Airy, is interested in new organization.

Southern Public Utilities Co., Second Street, Winston-Salem, N. C., operating a motor bus service, will install a machine and repair shop in one-story garage and service building, 100 x 135 ft., for which general contract has been let to Fogle Brothers Co., Belews Creek Road. S. L. Duckett, 505 Crescent Avenue, Charlotte, N. C., is architect.

Certain-teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing products, etc., is reported planning new plant at Savannah, Ga., where more than 40 acres recently was acquired, to cost over $500,000 with machinery. It is understood that a subsidiary will be organized to carry out project.

J. B. Hecht, Flatiron Building, Norfolk, Va., is interested in machinery for developing mica mines and for manufacture of mica and feldspar products.

Cleveland

CLEVELAND, June 24.—Machine-tool sales were in moderate volume the past week. Business was confined to single tools, largely for replacement. Most buyers want early deliveries and while delivery of some lines shows quite an improvement, other manufacturers are losing orders because of long deferred shipments. June sales will show quite a recession from those in May. Inquiry is rather light. While some business in fair sized lots was placed by the Michigan automobile industry the past week, not a great deal of activity in that field is expected before fall.

Empire Steel Corporation, Mansfield, Ohio, will make improvements and additions to its Falcon plant at Niles involving an expenditure of about $250,000. A battery of five continuous sheet furnaces and a normalizing furnace will be installed and other equipment added to increase cold rolling capacity.

Midland Steel Products Co., Cleveland, will rearrange and make additions to its Cleveland plant at an expenditure of $175,000. A new automatic paint machine will be installed, frame handling facilities increased, and car loading space and warehouse capacity enlarged.

Sidney Brass Works Co., Sidney, Ohio, manufacturer of brass, bronze and aluminum castings has taken over Wapak Holloware Co., Wapakoneta, manufacturer of gas cooking utensils and will begin operation of that plant about July 1. George Trautman is president and general manager.

Extruded Metal Products Co., Bridgeport, Ohio, is building a new foundry to cost about $25,000 with equipment. An item published in June 13 issue incorrectly gave company's location as Wheeling, W. Va. J. W. Millard is president.

Boston Gear Works Sales Co., Norfolk Downs, Mass., has moved its Cleveland branch to 211 St. Clair Avenue, N. W.

Cleveland Automatic Machine Co., 2269 East Sixty-fifth Street, Cleveland, manufacturer of chucking machines and other automatic machine tools, has plans for new one-story units at Elyria, Ohio, totaling 170,000 sq. ft. floor space, to cost about $250,000 with equipment. Wright & Nice, 4339 South Saginaw Street, Flint, Mich., are architects.

Plant and property of Napoleon Stamping Co., Napoleon, Ohio, manufacturer of metal stampings, has been acquired jointly by C. O. Miniger, president, Electric Auto Lite Co., Toledo, Ohio, and C. S. McIntyre, president, Monroe Auto Equipment Co., Monroe, Mich. Plant will be continued in service and expansion carried out.

Mahoning Ice & Fuel Co., 27 West Indianola Avenue, Youngstown, is planning one-story ice-manufacturing plant, to cost about $55,000 with equipment.

General Fireproofing Co., Youngstown, manufacturer of expanded metal lath, metal furniture, etc., has plans for new unit totaling about 90,000 sq. ft. floor space, to cost $275,000 with equipment. It will be used in part for production of aluminum chairs and kindred specialties.

Willys-Overland Co., Toledo, Ohio, has taken over plant at Elyria, Ohio, formerly used for manufacture of Falcon automobiles by its subsidiary, Falcon Motors Corporation, and will operate as Elyria Division for production of automobile bodies, as well as motor truck bodies.

Gulf States

BIRMINGHAM, June 24.—Geisecke & Harris, Second National Bank Building, Houston, Tex., architects, have plans for a new airport on Chocolate Bayou Road, to be known as Metropolitan air terminal, for company being organized under direction of Theodore Ahlborn. Houston, consulting engineer. Tract of 250 acres has been secured. Work will include group of hangars, each 120 x 125 ft., to house 24 planes; machine and repair shop, administration building, oil storage and distributing plant and other units, to cost over $500,000 with equipment.

United Gas Co., Fort Worth, Tex., has authorized construction of pipe line from Jennings gas field, Zapata County, to Monterey, Mexico, about 125 miles, for natural gas supply. Project will cost more than $3,000,000 with compressor stations and other operating facilities. A subsidiary will be organized to carry out work and operate line under name of Cia Mexicana De Gas S. A.

Planters' Package Co., Crystal Springs, Miss., is said to be planning construction of a machine shop and power house in connection with rebuilding part of crate and crating material manufacturing plant, recently destroyed by fire.

Witt, Seibert & Halsey, Texarkana, Tex.-Ark., architects, have awarded general contract to Oats Brothers Construction Co., Texarkana, for three and four-story automobile service, repair and garage building, 100 x 140 ft., to cost about $100,000 with equipment.

Board of Regents, University of Texas, Austin, has awarded general contract to H. E. Wattinger, 401 St. Paul Street, for one-story mechanical engineering laboratory, to cost about $175,000 with equipment. Herbert M. Greene, La Roche & Dahl, Construction Industries Building, Dallas, Tex., are architects.

J. N. McDonald, 714 First Bank & Trust Co. Building, Sarasota, Fla., is at head of project to construct and operate a hydroelectric power plant on Oklawaha River, Marion and Putnam Counties. Initial installation will have capacity of 16,000 hp., to cost more than $750,000 with power dam and transmission lines.

Curtiss Airports Corporation, affiliated with Curtiss Flying Service, 27 West Fifty-seventh Street, New York, has acquired 450 acre tract at Houston, Tex., as site for a central airport for that district, to include hangars, repair shops and other units, to cost more than $150,000 with equipment.

F. H. Douthitt, 100 West Monroe Street, Chicago, head of Douthitt Engineering Co., same address, is said to be closing negotiations with Chamber of Commerce, Mount Pleasant, Tex., C. A. Pickett, secretary, for construction of a new plant for production of powdered milk, under name of Texas Milk Products Co., to cost $150,000 with machinery. Contracts for buildings and equipment will be awarded in August.

Mid-Tex Oil & Gas Co., Mims Building, Abilene, Tex., is planning extensions and improvements in local oil refinery. Machinery purchases are expected to be made soon.

Board of Education, Greenville, Miss., plans installation of manual training equipment in new junior high school to cost $225,000, for which plans are being drawn by N. W. Overstreet, Mississippi Fire Insurance Co. Building, Jackson, Miss., architect.

St. Louis

ST. LOUIS, June 24.—Board of Education, St. Louis, has plans for two unit vocational schools, each five stories, 160 x 230 ft., for laboratories and kindred service, and 188 x 275 ft., for mechanical shops, etc., to cost $1,400,000 with equipment. Plans are also in progress for one-story auto mechanics shop addition to Cleveland high school, Louisiana Avenue, to cost about $30,000 with equipment. R. M. Milligan is commissioner of school buildings.

Voice of St. Louis, Inc., 421 North Eighth Street, St. Louis, N. P. Darragh, president, is planning radio broadcasting station, including power house, steel towers, etc., to cost $350,000.

Beacon Airways of America, Inc., Board of Trade Building, Kansas City, Mo., will soon take bids on general contract for one-story aircraft plant, 60 x 155 ft., to cost about $100,000 with equipment. Departments for parts production and assembling will be installed. Clarence E. Shepard, Huntzinger Building, is architect.

Plant and property of Mid-West Electric Machinery Co., Picher, Okla., has been acquired by new interests, headed by G. A. Spaulding and Ray A. Berentz. Plans are being considered for expansion, including additional equipment.

Mid-West Piping & Supply Co., Second and Barry Streets, St. Louis, manufacturer of pipe coils, bends, fittings, etc., has awarded general contract to Cannie Construction Co., Ridgefield, N. J., for one-story factory branch and distributing plant at Clifton, N. J., to cost about $65,000 with equipment.

William P. McMahon, Buder Building, St. Louis, architect, will take bids at once for one-story and basement automobile service, repair and garage building, 125 x 360 ft., to cost about $100,000 with equipment.

Capitol Steel & Iron Co., Oklahoma City, Okla., is reported planning erection of one-story plant, to cost over $150,000 with equipment.

International Harvester Co., 701 K Street, Lincoln, Neb., is reported planning three-story factory branch and distributing plant on local site, for implement division, to cost about $200,000 with equipment. Headquarters are at 606 South Michigan Avenue, Chicago.

Chamber of Commerce, Camden, Ark., Luther Ellison, secretary, is planning municipal airport, including hangars, repair shops, oil storage and other buildings, to cost more than $60,000 with equipment. Property has been leased.

City Council, Clay Center, Neb., has plans for a municipal electric light and power plant to cost about $40,000 with equipment. Grant & Fulton, 525 South Thirteenth Street, Lincoln, Neb., are architects.

B-L Electric Mfg. Co., St. Louis, has taken over manufacturing division of Benwood-Linze Co. and will manufacture dry metallic rectifiers, also complete assembled units for operating electric clocks, signals, burglar alarms and other apparatus requiring direct current. Officers of B-L Electric Mfg. Co. are: Harold J. Wrape, president; C. R. Ogle, vice-president, and Carl Hambuechen, secretary-treasurer. Plant is at Nineteenth Street and Washington Avenue, St. Louis.

Pacific Coast

SAN FRANCISCO, June 20.—Officials of Axelson Machine Co., 6160 South Boyle Avenue, Los Angeles, manufacturer of oil well pumps, gray iron castings, etc., have organized Axelson Airplane Engine Co., a subsidiary, to manufacture aircraft motors and parts. Plans are under way for a new plant on 3-acre tract at Huntington Park, one story, 120 x 220 ft., for parts production and assembling, to cost about $90,000 with machinery.

Vortex Wing Corporation, Glendale, Cal., manufacturer of aircraft specialties, has plans for a one-story unit, 66 x 85 ft., to cost about $25,000 with equipment. Carl J. Weyl, 6536 Sunset Boulevard, Los Angeles, is architect.

Bach Aircraft Co., Inc., Los Angeles, is planning early rebuilding of part of assembling plant destroyed by fire June 21.

Perfect Caster Mfg. Co., Los Angeles, will soon begin construction of one-story plant, 70 x 100 ft., at Long Beach, Cal., to cost about $40,000 with equipment. R. D. Van Alstine, Heartwell Building, Long Beach, is architect.

Riviera School District, Riviera, Cal., has plans for a one-story manual arts building at local high school, to cost about $24,000 with equipment. Robert H. Orr, Corporation Building, Los Angeles, is architect.

Western Washington Light & Power Co., Aberdeen, Wash., an interest of Federal Light & Traction Co., 52 William Street, New York, has plans for a hydroelectric generating plant in Grays Harbor section, including power dam, 120 ft. high and 400 ft. long, and power house. Project will include a 40-mile steel tower transmission line and is estimated to cost $3,500,000. Sanderson & Porter, 52 William Street, New York, are engineers.

Southern California Gas Co., Los Angeles, is planning construction of pipe lines for natural gas from Kettleman Hills district to San Joaquin Valley section, and from Kettleman Hills to Elk Hills and vicinity, to cost $2,200,000 with booster stations and other operating facilities.

W. Sidney Orme, Wright & Callender Building, Los Angeles, architect, has plans for a one-story iron and steel mill, 62 x 200 ft., for company whose name is temporarily withheld. Installation will include two 10-ton traveling cranes and six jib cranes.

Milwaukee

MILWAUKEE, June 24.—There is an active demand for equipment from a wide variety of industries, and while individual orders are not large, the aggregate makes up a substantial volume. In most cases, new business is equal to deliveries, although in others a slight falling off is noted. However, practically all tool builders are still considerably behind on shipments and cannot hope to catch up before the end of summer. The shortage of skilled machinists continues acute.

Chicago, Milwaukee, St. Paul & Pacific Railway, C. F. Loweth, Union Station, Chicago, chief engineer, has placed contract with Foundation Co., 120 Liberty Street, New York, for an addition, 200 x 1000 ft., to car repair department at West Milwaukee shops, Milwaukee. Temporarily new building will be used for operations now conducted in open, but later it will be tooled for complete construction of freight cars and special passenger rolling stock, such as club, lounge and observation cars. Present investment is estimated at from $950,000 to $1,000,000. K. F. Nystrom is general superintendent at Milwaukee.

Eastman Mfg. Co., 1002 North Eleventh Street, Manitowoc, Wis., manufacturer of hose couplings and other metal specialties, is deferring construction of an addition until fall or early next year. Plans are by William J. Raeuber, local architect.

Board of Public Works, Marquette, Mich., is about ready for bids for construction of a $50,000 municipal warehouse, garage and service building for a city light and power bureau. J. F. Anderson is city purchasing agent, and Charles Retallic is light and power superintendent.

National Radiator Corporation, 124 Jefferson Street, Milwaukee, has started work on a one-story warehouse and service shop, 100 x 172 ft., with wing, 40 x 72 ft.

Board of Industrial Education, Manitowoc, Wis., is about to close bids for a two-story addition, 46 x 84 ft., to Manitowoc vocational school, designed by William J. Raeuber, local architect, and estimated to cost $50,000 without equipment, which will be purchased later. A. L. Nimtz is director.

Nordberg Mfg. Co., Milwaukee, is taking bids for a one-story brick and steel erecting shop, 92 x 136 ft.

Board of Industrial Education, LaCrosse, Wis., has accepted bid of J. L. Wallace, local builder, for general contract on $50,000 addition to LaCrosse vocational school.

Briggs & Stratton Corporation, Milwaukee, has been purchasing considerable new production equipment required by a contract with McKinney Hardware Co., Pittsburgh, for new type of cylindrical padlock recently perfected by Milwaukee company's research laboratory. Immediate output of 1500 dozen locks per week has been scheduled.

Canada

TORONTO, June 24.—While machine tool sales are tapering somewhat, dealers and builders report a large prospective demand. Inquiries are in good volume and lists are beginning to appear on which delivery is asked from three to five months. The automotive industry as a whole is furnishing a steady flow of new business, but mostly in small units.

Preliminary work has been started on an addition to plant of [illegible] C. A. Dunham Co., Ltd., Davenport Road and Primrose Avenue, Toronto. Proposed plans call for erection of a three-story factory, 40 x 50 ft., and new boiler house, 40 x 50 ft. Company manufactures steam heating and power plant equipment.

Canadian National Railways will spend about $50,000,000 on extensions and improvements to terminal facilities at Montreal, work to include a new coach yard, engine house and electrification of lines leading to passenger terminals.

Dominion Gas Co., Hamilton, Ont., has option on a five-acre site at Port Stanley, Ont., and will start work soon on construction of a coke plant to cost $3,000,000.

Neu-Flame, Ltd., Dundas, Ont., recently incorporated with a capital stock of $1,000,000, has acquired property and buildings of Caldwell Canning Co. and will establish plant to manufacture a

new type of patented lamp and burner, vacuum power attachments, lawn mower attachments, etc.

Western Canada

Canadian National Railways will immediately rebuild car shops at Melville, Sask., recently destroyed by fire.

Anthes Foundry Co., Ltd., Toronto and Winnipeg, has purchased a site at Calgary, Alberta, for erection of a new plant.

Foreign

OFFICIALS of General American Tank Car Corporation, 230 South Clark Street, Chicago, manufacturer and operator of railroad tank cars, have organized Germania Allegmeine Transport Leighesellschaft, a subsidiary, capitalized at $2,500,000, to operate a plant in Germany. Initial works will be established soon. Max Epstein is president of parent company and will head subsidiary interest.

D. Gestetner, Ltd., London, England, Sigmund Gestetner, managing director, manufacturer of office duplicating equipment and devices, has arranged for purchase of part of former plant of International Arms & Fuse Co., Bloomfield, N. J., recently held by General Motors Corporation, and will remodel for manufacture and distribution in United States. Initial production will begin early in August. Frank Grad, 1023 Broad Street, Newark, is architect.

Toho Electric Power Co., Ltd. (Toho Denryoku Kabushiki Kaisha), Tokyo, Japan, operating 44 electric generating stations with transmission lines, etc., is disposing of note issue in United States to total $11,450,000, part of proceeds to be used for extensions and improvements. Y. Matsunaga is president.

Municipal Council, Caguas, Porto Rico, is planning early call for bids for filtration plant for municipal waterworks, of rapid sand filtration type, to cost $130,000.

Officials of Anglo-Chilean Consolidated Nitrate Corporation, 120 Broadway, New York, headed by Guggenheim Brothers, same address, have organized Lautaro Nitrate Co., Ltd., London, England, and an affiliated organization, Lautaro Nitrate Corporation, under Delaware laws, to develop and operate nitrate plants and properties in Chile. A bond issue of $32,000,000 is being sold, a large part of proceeds to be used for construction of new plant on tract of 40 sq. mi. of nitrate lands in Chile. It will have initial capacity of 450,000 metric tons of material per year, and is scheduled for completion within 36 months.

Ford Motor Co., Detroit, is said to be planning early construction of new assembling plant at Montijo, near Lisbon, Portugal, to cost more than $500,000 with equipment. Company proposes to develop new waterfront industrial community at place noted.

New Trade Publications

Mill Gear Units.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1831 is concerned with helical and herringbone gear units for heavy-duty drives. Of notable interest to engineers is a chart containing curves from which the size and weight of flywheels, for use with these mill units or similar equipment, can readily be determined without recourse to mathematics.

Water Wheels.—James Leffel & Co., Springfield, Ohio. Folder illustrating vertical-shaft water turbines installed in a plant at Hamilton, Ohio, belonging to the Ford Motor Co. and used in generating electric power.

Gas Booster. — Connersville Blower Co., Connersville, Ind. Bulletin 233 of 14 pages, illustrated, describes Victor gas boosters for gas-burning furnaces and ovens and for other services. Drive is by direct-connected electric motor or by belt.

Grinding Wheels. — Blanchard Machine Co., Cambridge, Mass. Illustrated booklet of 16 pages describing grinding wheels designed particularly for use in Blanchard grinders. Many of the illustrations show applications to particular grinding problems.

Pipe Bender.—Gustav Lidseen, Inc., 832 South Central Avenue, Chicago. Folder illustrating and describing a hydraulic pipe bender of 30 tons capacity for bending or straightening conduit, pipe, tubes or bars 2 in. to 4 in. in diameter. The machine weighs 310 lb.

Safety Starter.—Lincoln Electric Co., Cleveland. Folder of four pages illustrating and describing a safety starter for motors operated on the push-button principle.

Steel Castings.—Nugent Steel Casting Co., Chicago. Bulletin No. 117 is a two-page leaflet which describes the unusually large number of skilled artisans which are necessary in producing today steel castings of the quality demanded by industry. It is uniquely illustrated.

Nickel Steel. — International Nickel Co., New York.—An eight-page illustrated pamphlet containing the reprint of an article entitled "The Manufacture of Nickel Steel Plate," from the *Transactions* of the American Society of Mechanical Engineers. The authors are Charles McKnight of the Nickel company and W. G. Humpton, metallurgists, Lukens Steel Co., Coatesville, Pa.

Foundry Equipment.—Link-Belt Co., Chicago. Three four-page leaflets describe materials' conveying equipment for foundry purposes. One is entitled "Continuous Malleable Foundry," describing the equipment in the plant of the Saginaw Malleable Iron Division of the General Motors Corporation, Saginaw, Mich. Another is entitled "American Manganese Steel Company," in which is described three Link-Belt foundry installations, one at the Manganese company's Burnside plant in Chicago and two at its plants at Chicago Heights, Ill. The third is entitled "Link-Belt Vibrating Screen the Ideal Sand Reclaiming and Shake-Out Unit," and gives extracts from the company's 16-page book, No. 862, dealing with this particular kind of installation.

Temperature Controlling Instruments.—Brown Instrument Co., Philadelphia. An eight-page illustrated folder describes the use of indicating and recording instruments, made by this company and used in the control of the process of hydrogen copper brazing as developed by the General Electric Co.

Nichrome.—Driver-Harris Co., Harrison, N. J. A two-page illustrated leaflet containing testimony of the Westinghouse Elec. & Mfg. Co. and the Kelly Axe & Tool Co. on the use of this alloy for hardening and tempering pots electrically heated.

Electric Heat-Treating Furnaces.—Westinghouse Electric & Mfg. Co., Pittsburgh. A four-page illustrated leaflet describing rotary pusher and tunnel as well as car and pit type electric furnaces for heat treating various steel and nonferrous products.

Recording Instruments.—Bristol Co., Waterbury, Conn. A six-page illustrated folder gives "facts and not impressions," as a guide to the successful manager who is obliged to use indicating, recording and controlling instruments for regulating the heat in chromium plating, bread baking, and other electrically or steam-heated equipment.

Rotary Positive Blowers.—P. H. & F. M. Roots Co., Connersville, Ind. Bulletin 22-B1 of 16 pages illustrates and describes low-pressure rotary blowers for all capacities, with pressures 2½ lb. or less. These blowers are now being fitted with roller bearings to increase their efficiency of operation. Illustrations include sectional and installation views.

Production Machinery. — Ingersoll Milling Machine Co., Rockford, Ill. Folder of four pages illustrating a line of milling, boring, drilling, tapping and reaming machines and cutter grinders, designed for production work.

Forgings and Coils. — Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. Booklet of 40 pages illustrating and describing a large number of specialties, most of which are forged, and including coils and bends of pipe. Rolled products, also, are covered.

Immersion Heater.—General Electric Co., Schenectady, N. Y. Bulletin GEA-214-A of four pages illustrates and describes a heater for immersion in liquids. The heating element is coiled nickel-chromium resistor, embedded in magnesium oxide and incased in a metal protecting sheath.

Motor Starter.—Electric Controller & Mfg. Co., Cleveland. Bulletin of four pages illustrating and describing an automatic starter for synchronous motors. It is of the push-button type.

Shock Absorber.—Thompson Electric Co., 1428 West Ninth Street, Cleveland. Bulletin illustrating and describing shock absorbers for costly special electric light bulbs. These are reported to give the bulbs considerably increased life.

Temperature Control.—Bristol Co., Waterbury, Conn. Bulletin 371 of four pages illustrates and describes a hot-blast control system to be used in connection with blast furnace operations. This is automatic, but is equipped to permit hand control when desired.

Metal Coating.—Metals Coating Co. of America, 497 North Third Street, Philadelphia. Circular illustrating and describing applications of "Meta-Layer," a tool for putting metal surfaces on all types of metal products. Among its uses are: to fill surface defects in castings, to build up undersize metal parts, to apply decorative metal coatings, to protect iron and steel parts and structures against corrosion and to protect chemical tanks against corrosion.

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